

Final

TMDLs for Fecal Coliform Bacteria, Chlorides, Sulfates, Total Dissolved Solids, and Turbidity for Selected Subsegments in the Red River Basin, Louisiana

(100306, 100406, 100707, 100708, 100709, 100710, 100801,
100804, 100901, 101101, 101103, 101301, 101303, 101401)

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EXECUTIVE SUMMARY

Section 303(d) of the Clean Water Act and the U.S. Environmental Protection Agency's (EPA) Water Quality Planning and Management Regulations (Title 40 of the *Code of Federal Regulations* [CFR] Part 130) require states to develop Total Maximum Daily Loads (TMDLs) for impaired waterbodies. A TMDL establishes the amount of a pollutant that a waterbody can assimilate without exceeding its water quality standard for that pollutant. TMDLs provide the scientific basis for a state to establish water quality-based controls to reduce pollution from both point and nonpoint sources to restore and maintain the quality of the state's water resources (USEPA 1991).

A TMDL for a given pollutant and waterbody is composed of the sum of individual wasteload allocations (WLAs) for point sources and load allocations (LAs) for nonpoint sources and natural background levels. In addition, the TMDL must include an implicit or explicit margin of safety (MOS) to account for the uncertainty in the relationship between pollutant loads and the quality of the receiving waterbody and may include a future growth (FG) component. The TMDL components are illustrated using the following equation:

$$TMDL = \sum WLAs + \sum LAs + MOS + FG$$

The study area for this TMDL is the Red River Basin, which is in northwestern Louisiana. The Red River originates in eastern New Mexico and flows through portions of Texas, Oklahoma, and Arkansas before crossing the Louisiana state border. The river enters northwestern Louisiana and flows southward to Shreveport. The Red River joins the Atchafalaya River, which then flows to the Gulf of Mexico. Forest is the dominant land use in all but six of the listed subsegments in the Red River Basin. Most of the remaining subsegments have large areas of row crops, except two subsegments that have large urban areas.

Louisiana Department of Environmental Quality (LDEQ) included 23 subsegments in the Red River Basin on the state's 2004 section 303(d) list for various impairments. This TMDL report addresses 14 of the 23 listed subsegments (Table ES-1). Other reports cover the remaining nine subsegments. The impaired designated uses for the 14 subsegments are primary contact recreation, fish and wildlife propagation, and drinking water supply. The pollutants causing these impairments include fecal coliform bacteria, chloride, sulfate, total dissolved solids (TDS), and turbidity.

The numerical water quality criteria that apply to the impaired subsegments in the Red River Basin and that were used to calculate the total allowable loads are presented in Table ES-2.

Because turbidity cannot be expressed as a mass load, the turbidity TMDL was expressed using total suspended solids (TSS) as a surrogate for turbidity. Historical water quality data were analyzed for relationships between turbidity and TSS. A regression between turbidity and TSS was developed for subsegment 101401 using turbidity and TSS data from that subsegment, resulting in a surrogate TSS endpoint of 18 mg/L.

Table ES-1. Section 303(d) listing for stream reaches included in this report

Subseg. number	Subseg. name	Impaired use ^a	Causes of impairment					Suspected sources of impairment
			Chloride	Sulfate	TDS	Turbidity	Fecal coliforms	
100306	Kelly Bayou	PCR				X		Managed pasture grazing
100406	Flat River	PCR, FWP		X		X		Residential districts (TDS), managed pasture grazing (fecal coliforms)
100707	Castor Creek	PCR				X		Wildlife other than waterfowl
100708	Castor Creek tributary	FWP		X	X			Natural conditions—Water quality standards use attainability analyses needed
100709	Grand Bayou	PCR, FWP				X		Wildlife other than waterfowl
100710	Grand Bayou tributary	FWP	X	X	X			Municipal point source discharges
100801	Saline Bayou	PCR, FWP				X		Natural sources
100804	Saline Bayou tributary	FWP		X	X			Municipal point source discharges
100901	Bayou Nantaches	PCR, FWP				X		On-site treatment systems, package plant, or other permitted small-flow discharges
101101	Cane River	FWP, DWS	X		X			Natural conditions—Water quality standards use attainability analyses needed
101103	Bayou Kisatchie	PCR, FWP			X		X	Natural conditions—Water quality standards use attainability analyses needed (TDS), managed pasture grazing (fecal coliforms)
101301	Rigolette Bayou	PCR, FWP				X		Package plant or other permitted small flows discharges
101303	Iatt Creek	FWP			X			Natural conditions—Water quality standards use attainability analyses needed
101401	Buhlow Lake	FWP				X		Natural conditions—Water quality standards use attainability analyses needed

^aPCR = primary contact recreation; FWP = fish and wildlife propagation; DWS = drinking water supply

Source: LDEQ 2005a.

The TMDLs for all pollutants (fecal coliform bacteria, turbidity, chloride, TDS, and sulfate) were developed using the load duration curve methodology. This method illustrates allowable loading at a wide range of streamflow conditions. The steps for applying this methodology were (1) developing a flow duration curve; (2) converting the flow duration curve to load duration curves; (3) plotting observed loads with load duration curves; (4) calculating the TMDL, MOS, FG, WLA, and LA; and (5) calculating percent reductions. Fecal coliform bacteria TMDLs were calculated seasonally on the basis of analyses of the applicable water quality criteria (i.e., calculating allowable loads and percent reductions for both summer and winter). The TMDLs for the other pollutants (chloride, sulfate, TDS, and turbidity) were not developed for a particular season and apply year-round.

Table ES-2. Numeric water quality criteria for the listed subsegments

Subsegment number	Subsegment name	Chloride (mg/L)	Sulfate (mg/L)	TDS (mg/L)	Turbidity (NTU)	Bacteria ^a (colonies/100 mL)
100306	Kelly Bayou					400 (5/01–10/31) 2,000 (11/01–4/30)
100406	Flat River			300		400 (5/01–10/31) 2,000 (11/01–4/30)
100707	Castor Creek					400 (5/01–10/31) 2,000 (11/01–4/30)
100708	Castor Creek tributary		9	79		
100709	Grand Bayou					400 (5/01–10/31) 2,000 (11/01–4/30)
100710	Grand Bayou tributary	26	9	79		
100801	Saline Bayou					400 (5/01–10/31) 2,000 (11/01–4/30)
100804	Saline Bayou tributary		20	250		
100901	Bayou Nantaches					400 (5/01–10/31) 2,000 (11/01–4/30)
101101	Cane River	25		100		
101103	Bayou Kisatchie			100		400 (5/01–10/31) 2,000 (11/01–4/30)
101301	Rigolette Bayou					400 (5/01–10/31) 2,000 (11/01–4/30)
101303	Iatt Creek			100		
101401	Buhlow Lake				25	

^a Criteria for primary and secondary contact recreation apply. Primary contact recreation: No more than 25 percent of the total samples collected on a monthly basis shall exceed a fecal coliform bacteria density of 400/100 mL. This shall apply only during the defined recreational period of 5/01 through 10/31. For all other periods, a fecal coliform bacteria density of 2,000/100 mL for secondary contact recreation applies.

Source: LDEQ 2005b

In TMDL development, allowable loadings from all pollutant sources that cumulatively amount to no more than the TMDL must be established and thereby provide the basis for establishing water quality-based controls. WLAs were given to permitted point source discharges, including Phase I and Phase II municipal separate storm sewer systems (MS4s). The LAs include background loadings as well as human-induced nonpoint sources. An explicit MOS of 10 percent was included, except for turbidity, sediment, and TSS, which had an implicit MOS. A FG component of 10 percent is also included in this TMDL.

None of the subsegments requires fecal coliform bacteria reductions in the winter months, and the summer month reductions range from 0 to 78 percent. The chloride-impaired subsegments require reductions of 52 and 59 percent. The reductions for sulfate range from 0 to 86 percent. TDS reductions range from 44 to 77 percent, and the reduction for the one subsegment impaired by turbidity is 43 percent. Summaries of the TMDLs for the subsegments addressed in this report are presented in Tables ES-3 through ES-5.

Hurricane Katrina made landfall on Monday, August 29, 2005, as a Category 4 hurricane. The storm brought heavy winds and rain to southeast Louisiana, breaching several levees and flooding up to 80 percent of New Orleans and large areas of coastal Louisiana. Much of the area that was flooded during Hurricane Katrina was flooded again by the storm surge from Hurricane Rita. Both Hurricanes Katrina and Rita have caused a significant amount of change in

Table ES-3. Summary of fecal coliform bacteria TMDLs, MOS, FG, WLAs, and LAs for the Red River Basin

Subsegment	Station	Season	Percent reduction	Total allowable load	Explicit MOS (10%)	Future growth (10%)	Σ WLA	Σ LA
				$1 \times 10^9 \text{ cfu/day}$				
100306	56	Summer	54.4	21.76	2.18	2.18	0.00	17.40
100306	56	Winter	0.0	372.30	37.23	37.23	0.00	297.84
100406	272	Summer	48.6	62.32	6.23	6.23	5.90	43.95
100406	272	Winter	0.0	602.60	60.26	60.26	5.90	476.18
100707	1189	Summer	55.0	17.52	1.75	1.75	0.00	14.02
100707	1189	Winter	0.0	291.16	29.12	29.12	0.00	232.93
100709	1190	Summer	28.0	64.88	6.49	6.49	0.79	51.11
100709	1190	Winter	0.0	1,083.34	108.33	108.33	0.79	865.89
100801	75	Summer	0.0	144.65	14.47	14.47	0.86	114.86
100801	75	Winter	0.0	2,415.52	241.55	241.55	0.86	1,931.55
100901	1215	Summer	77.5	56.33	5.63	5.63	0.76	44.30
100901	1215	Winter	0.0	632.08	63.21	63.21	0.76	504.91
101103	1218	Summer	77.5	205.84	20.58	20.58	0.00	164.67
101103	1218	Winter	0.0	2,991.37	299.14	299.14	0.00	2,393.09
101301	1220	Summer	0.0	129.85	12.98	12.98	4.12	99.76
101301	1220	Winter	0.0	1,457.13	145.71	145.71	4.12	1,161.58

Table ES-4. Summary of chloride and sulfate TMDLs, MOS, FG, WLAs, and LAs for the Red River Basin

Subsegment	Station	Pollutant	Percent reduction	Total allowable load	Explicit MOS (10%)	Future growth (10%)	Σ WLA	Σ LA
				kg/day				
100710	1195	Chloride	59.2	10.24	1.02	1.02	4.92	3.27
101101	1217	Chloride	51.9	2,374.26	237.43	237.43	80.78	1,818.63
100708	1194	Sulfate	54.5	10.88	1.09	1.09	1.70	7.00
100710	1195	Sulfate	85.9	3.54	0.35	0.35	1.70	1.13
100804	1206	Sulfate	0.0	51.33	5.13	5.13	37.85	3.21

Table ES-5. Summary of TDS and TSS TMDLs, MOS, FG, WLAs, and LAs for the Red River Basin

Subsegment	Station	Pollutant	Percent reduction	Total allowable loading	Explicit MOS (10%)	Future growth (10%)	Σ WLA	Σ LA
				ton/day				
100406	389	TDS	48.7	9.70	0.97	0.97	0.95	6.81
100708	1194	TDS	43.6	0.09	0.01	0.01	0.02	0.05
100710	1195	TDS	65.3	0.03	0.00	0.00	0.02	0.01
100804	1206	TDS	51.9	0.71	0.07	0.07	0.52	0.04
101101	1217	TDS	76.6	10.47	1.05	1.05	0.36	8.02
101103	42	TDS	76.7	11.34	1.13	1.13	0.00	9.08
101303	1222	TDS	63.4	4.36	0.44	0.44	0.00	3.49
101401	1223	Tur/TSS	43.3	0.04	Implicit	0.00	0.00	0.03

sedimentation and water quality in southern Louisiana. Many wastewater treatment facilities were temporarily or permanently damaged. Some wastewater treatment facilities will be rebuilt, while others will be relocated. The hurricanes expedited the loss of coastal land and modified the hydrology of some of the coastal waterbodies. Several federal and state agencies including EPA and LDEQ are engaged in collecting environmental data and assessing the recovery of the Gulf of Mexico waters. The proposed TMDLs in this report were developed on the basis of pre-hurricane conditions. Therefore, post-hurricane conditions and other factors could delay the implementation of these proposed TMDLs, render some proposed TMDLs obsolete, or could require modifications of the TMDLs. While hurricane effects may be valid for some TMDLs, any deviation from the TMDLs should be justified using site-specific data or information.

Much of coastal Louisiana was built by the process of delta formation through flooding and deposition of sediments by the rise and fall of the Mississippi River. According to EPA's present knowledge, extensive areas of wetlands and coastal marshes are affected by a high rate of subsidence and degradation, primarily due to a lack of historical sediment and nutrients entering the wetlands. Subsidence is a natural process, but the building of levee systems has restricted the Mississippi River's course and, therefore, is preventing the natural cycle of the river and the natural process of delta formation. According to EPA, a large portion of the state's coastal wetlands have undergone and continue to undergo severe deprivation of sediments and nutrients that has led to the breakup of the natural system. In addition, EPA believes that many of Louisiana's wetlands have become isolated from the riverine sources that created them and are becoming stagnant and starved for nutrients and organic and inorganic sediments. Note that restoring these eroding wetlands involves supplying nutrients to these areas through managed Mississippi River diversions.

According to EPA's understanding, if any future diversion from the Mississippi River or other tributaries will increase flow, the nonpoint source load allocation and TMDLs will also be increased proportionately. From EPA's current understanding, the diversion projects are supported by both state and federal agencies, including EPA and the U.S. Army Corps of Engineers (USACE). The diversions are managed by the USACE and the state, and the projects include post-diversion monitoring to determine effectiveness of the project and to monitor water quality conditions.

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1 INTRODUCTION

Section 303(d) of the Clean Water Act and the U.S. Environmental Protection Agency's (EPA) Water Quality Planning and Management Regulations (Title 40 of the *Code of Federal Regulations* [CFR] Part 130) requires states to develop Total Maximum Daily Loads (TMDLs) for waterbodies that are not supporting their designated uses, even if pollutant sources have implemented technology-based controls. A TMDL establishes the maximum allowable load (mass per unit of time) of a pollutant that a waterbody is able to assimilate and still support its designated uses. The maximum allowable load is determined on the basis of the relationship between pollutant sources and in-stream water quality. A TMDL provides the scientific basis for a state to establish water quality-based controls to reduce pollution from both point and nonpoint sources to restore and maintain the quality of the state's water resources (USEPA 1991).

Monitoring data collected by the Louisiana Department of Environmental Quality (LDEQ) indicate that observed pollutant levels sometimes exceed water quality criteria for 23 subsegments in the Red River Basin. The TMDL report, for this task order, addresses 14 of the 23 listed subsegments. Other reports cover the remaining nine subsegments. The impaired designated uses for the 14 subsegments are primary contact recreation, fish and wildlife propagation, and drinking water supply. The pollutants causing these impairments include fecal coliform bacteria, chloride, sulfate, total dissolved solids (TDS), and turbidity. Table 1-1 presents information from Louisiana's 2004 section 303(d) list for the 14 subsegments.

Table 1-1. Subsegments and parameters for impairments addressed in this report

Subseg. number	Subseg. name	Impaired use ^a	Causes of impairment					Suspected sources of impairment
			Chloride	Sulfate	TDS	Turbidity	Fecal coliforms	
100306	Kelly Bayou	PCR					X	Managed pasture grazing
100406	Flat River	PCR, FWP		X			X	Residential districts (TDS), managed pasture grazing (fecal coliform bacteria)
100707	Castor Creek	PCR					X	Wildlife other than waterfowl
100708	Castor Creek tributary	FWP		X	X			Natural conditions—Water quality standards use attainability analyses needed
100709	Grand Bayou	PCR, FWP					X	Wildlife other than waterfowl
100710	Grand Bayou tributary	FWP	X	X	X			Municipal point source discharges
100801	Saline Bayou	PCR, FWP					X	Natural sources
100804	Saline Bayou tributary	FWP		X	X			Municipal point source discharges
100901	Bayou Nantaches	PCR, FWP					X	On-site treatment systems, package plant, or other permitted small-flow discharges
101101	Cane River	FWP, DWS	X		X			Natural conditions—Water quality standards use attainability analyses needed
101103	Bayou Kisatchie	PCR, FWP			X		X	Natural conditions—Water quality standards use attainability analyses needed (TDS), managed pasture grazing (fecal coliform bacteria)

Table 1-1. (continued)

Subseg. number	Subseg. name	Impaired use ^a	Causes of impairment					Suspected sources of impairment
			Chloride	Sulfate	TDS	Turbidity	Fecal coliforms	
101301	Rigolette Bayou	PCR, FWP				X		Package plant or other permitted small flows discharges
101303	Iatt Creek	FWP		X				Natural conditions—Water quality standards use attainability analyses needed
101401	Buhlow Lake	FWP			X			Natural conditions—Water quality standards use attainability analyses needed

^a PCR = primary contact recreation; FWP = fish and wildlife propagation; DWS = drinking water supply

Source: LDEQ 2005a.

2 BACKGROUND INFORMATION

2.1 General Description

The 14 subsegments addressed in this TMDL report are in northwestern Louisiana (Figure 2-1) in portions of U.S. Geological Survey (USGS) hydrologic unit codes (HUCs) 11140204, 11140207, 11140208, 11140209, and 11140304. The subsegments are in portions of 10 parishes. All the subsegments flow to the Red River, which flows through central Louisiana. The Red River originates in eastern New Mexico and flows through portions of Texas, Oklahoma, and Arkansas before crossing the Louisiana state border. The river enters northwestern Louisiana and flows southward to Shreveport. The Red River joins the Atchafalaya River, which then flows to the Gulf of Mexico. The portion of the river from the Arkansas state line to the city of Alexandria, Louisiana, which is the portion addressed in this report, is characterized by high banks that range from 20 to 35 feet above low water level. Table 2-1 lists the parishes in which the subsegments are located and the approximate drainage area of each subsegment.

Table 2-1. Parish and drainage area for each listed subsegment in the Red River Basin

Subsegment number	Subsegment name	Parish	Drainage area (acres)
100306	Kelly Bayou	Caddo	2,950.1
100406	Flat River	Bossier, Red River	6,980.6
100707	Castor Creek	Bienville	2,175.6
100708	Unnamed Tributary to Castor Creek	Bienville	229.1
100709	Grand Bayou	Bienville, Red River	8,054.1
100710	Unnamed Tributary to Grand Bayou	Red River	45.9
100801	Saline Bayou	Bienville, Winn	17,958.1
100804	Unnamed Tributary to Saline Bayou	Bienville	151.6
100901	Bayou Nantaches	Grant, Winn	4,439.0
101101	Cane River	Natchitoches, Rapides	19,981.4
101103	Bayou Kisatchie	Natchitoches, Sabine, Vernon	21,652.1
101301	Rigolette Bayou	Grant, Natchitoches, Rapides	10,233.8
101303	Iatt Creek	Grant, Winn	10,134.1
101401	Buhlow Lake	Rapides	290.3

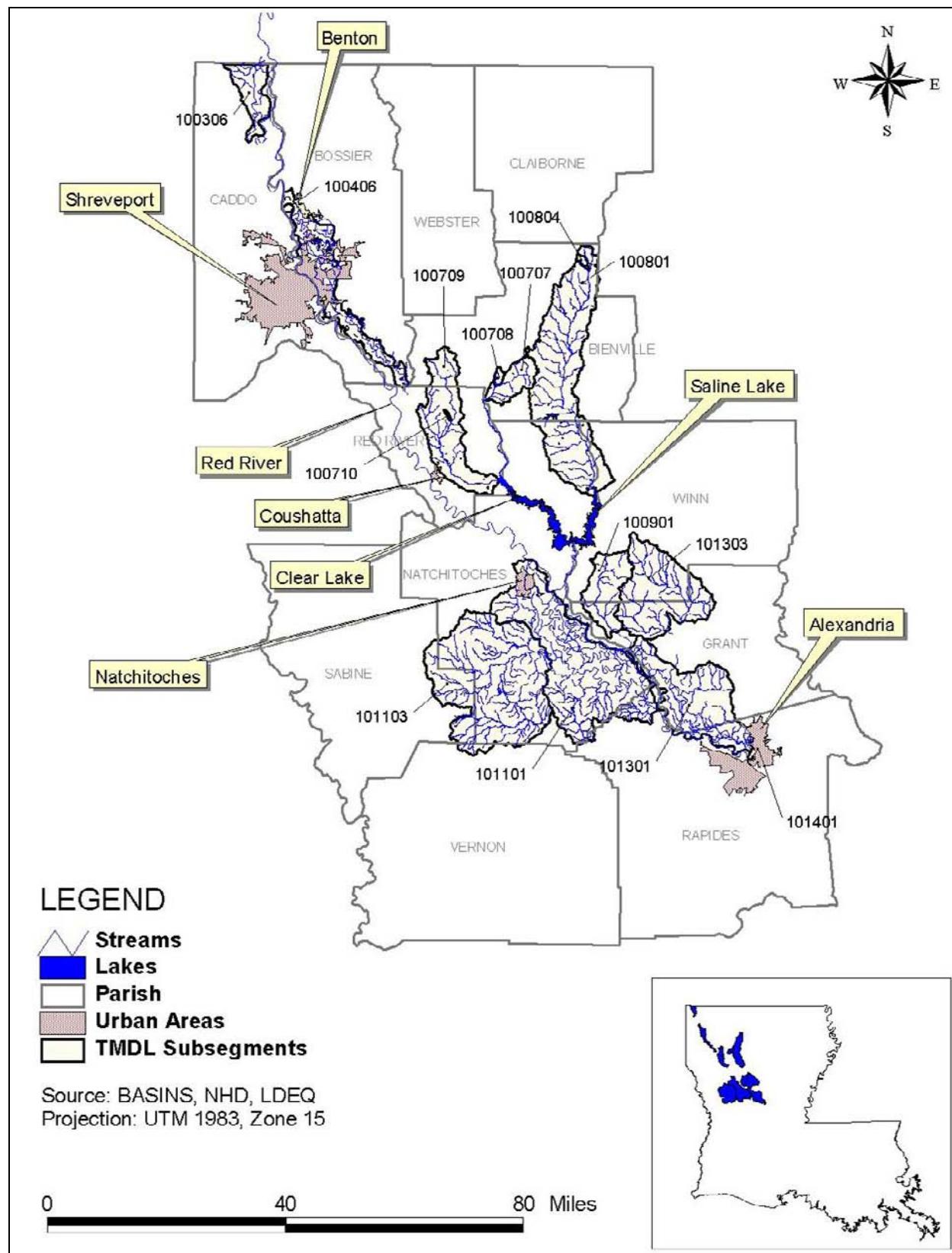


Figure 2-1. Location of Red River Basin subsegments.

2.2 Land Use

Land use data were obtained from the USGS National Land Cover Data set (NLCD). The NLCD data are based on satellite imagery from the early 1990s. Forest is the dominant land use in all but six of the listed subsegments in the Red River Basin. Most of the remaining subsegments have large areas of row crops except subsegments 100804 (Saline Bayou) and 101401 (Buhlow Lake), which have large urban areas. All other subsegments have only a small percentage of urban area; subsegment 100406 has the largest urban area at 12 percent. Table 2-2 and Figure 2-2 present the percentage of subsegment area covered by each land use and the land use coverage, respectively.

Table 2-2. Percent land use per subsegment

Land use	Percent coverage by subsegment number						
	100306	100406	100707	100708	100709	100710	100801
Water	0.4	0.8	0.4	0.5	0.8	0.5	1.3
Urban	0.4	12.3	0.2	2.4	0.2	0.1	0.3
Barren	0.8	0.1	5.1	0.0	1.4	0.2	3.5
Forest	37.0	11.8	83.2	81.7	65.3	55.5	81.4
Grasslands/herbaceous	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pasture/hay	18.1	17.1	2.4	4.7	12.2	21.0	2.3
Row crops	39.5	43.8	1.9	3.0	10.2	19.9	1.5
Small grains	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Urban/recreational grasses	0.0	3.1	0.0	0.0	0.0	0.0	0.0
Wetlands	3.8	10.9	6.8	7.6	9.9	3.1	9.8
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Land use	Percent coverage by subsegment number						
	100804	100901	101101	101301	101103	101303	101401
Water	2.0	0.4	1.8	1.2	0.5	0.2	8.5
Urban	44.0	0.4	2.2	2.6	0.2	0.3	38.5
Barren	0.1	3.3	1.1	0.5	3.7	2.9	0.1
Forest	28.4	80.6	40.2	47.6	83.2	86.6	42.1
Grasslands/herbaceous	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pasture/hay	13.6	3.6	7.7	7.2	1.5	1.7	1.4
Row crops	6.7	4.6	39.3	26.5	0.9	1.1	1.0
Small grains	0.0	0.0	1.2	1.1	0.0	0.0	0.0
Urban/recreational grasses	3.7	0.0	0.6	0.2	0.0	0.1	6.9
Wetlands	1.5	7.2	5.8	13.0	9.9	7.2	1.5
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0

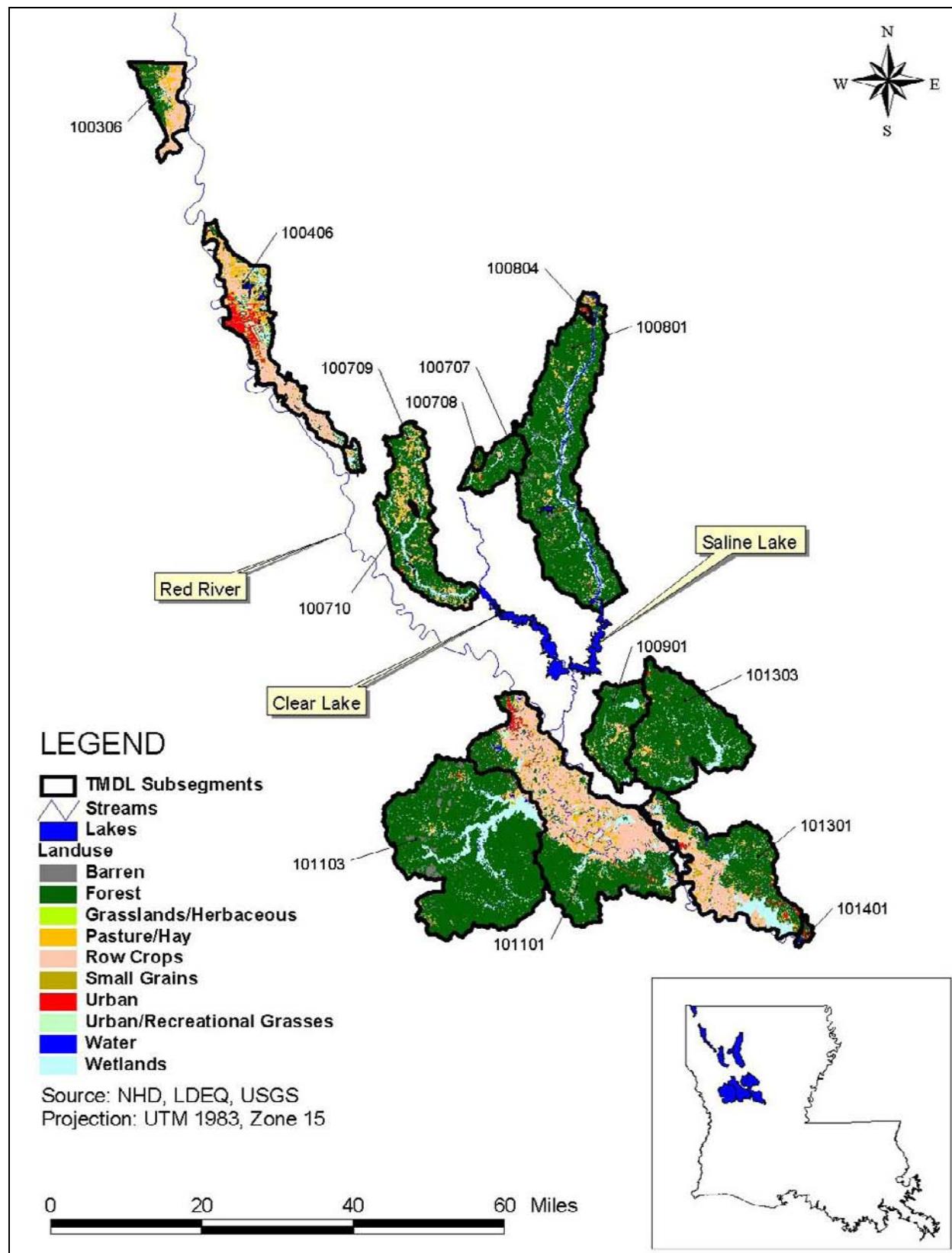


Figure 2-2. Land use in the Red River Basin subsegments.

2.3 Soils

General soils data for the United States are provided as part of the Natural Resources Conservation Service's (NRCS) State Soil Geographic (STATSGO) database. Soils data from this database and a geographic information system (GIS) coverage from NRCS were used to characterize soils in the Red River Basin subsegments.

One of the soil characteristics provided in the STATSGO database is the K-factor. The K-factor is a component of the Universal Soil Loss Equation, or USLE (Wischmeier and Smith 1978). The K-factor is a dimensionless measure of a soil's natural susceptibility to erosion, and values can range from 0 to 1.00. In practice, maximum factor values generally do not exceed 0.67. Large K-factor values reflect greater inherent soil erodibility. The distribution of K-factor values in the surface soil layers of the Red River Basin subsegments is shown in Figure 2-3 and Table 2-3. The figure indicates that, on average, the soils in the basin have K-factors that range from 0.181 to 0.485, suggesting a wide range of soil erosion potential. Erosion is influenced by a number of other factors, including rainfall and runoff, land slope, vegetation cover, and land management practices.

The hydrologic soil group classification is another commonly used soil characteristic provided in the STATSGO database. The hydrologic soil group is a means for grouping soils by similar infiltration and runoff characteristics. Clay soils that are poorly drained tend to have the lowest infiltration rates, whereas sandy soils that are well-drained have the highest infiltration rates. NRCS has defined four hydrologic groups for soils (Table 2-4). The STATSGO data were summarized using the major hydrologic group in the soil surface layers (Figure 2-4).

The northernmost subsegments (100306 and 100406) are made up mostly of soil types in the C hydrologic group (85 percent) with small portions of A and D. This suggests that these subsegments are dominated by slow-infiltration rates and fine-textured soils.

The subsegments in the middle of the Red River Basin (100804, 100708, 100710, 100801, 100707, and 100709) are a mixture of the B, C, and D hydrologic soil groups. There are no A soils in this section of the basin. Grand Bayou (100709), Castor Creek (100707), and the unnamed tributaries in each of those subsegments (100710 and 100708, respectively) contain mostly B soils, while Saline Bayou (100801) and its unnamed tributary (100804) are composed of mostly C soils.

Subsegments 101103 (Kisatchie Bayou) and 101101 (Cane River) are a mix of C and D soils with very small portions of A and B, meaning that these subsegments typically have slow drainage.

Subsegments 100901 (Bayou Nantaches), 101303 (Iatt Creek), and 101301(Rigolette Bayou) are a mixture of B, C, and D soils. There are no A soils in these subsegments. The small subsegment 101401 (Lake Buhlow) is entirely B soils, which are moderately well-drained soils.

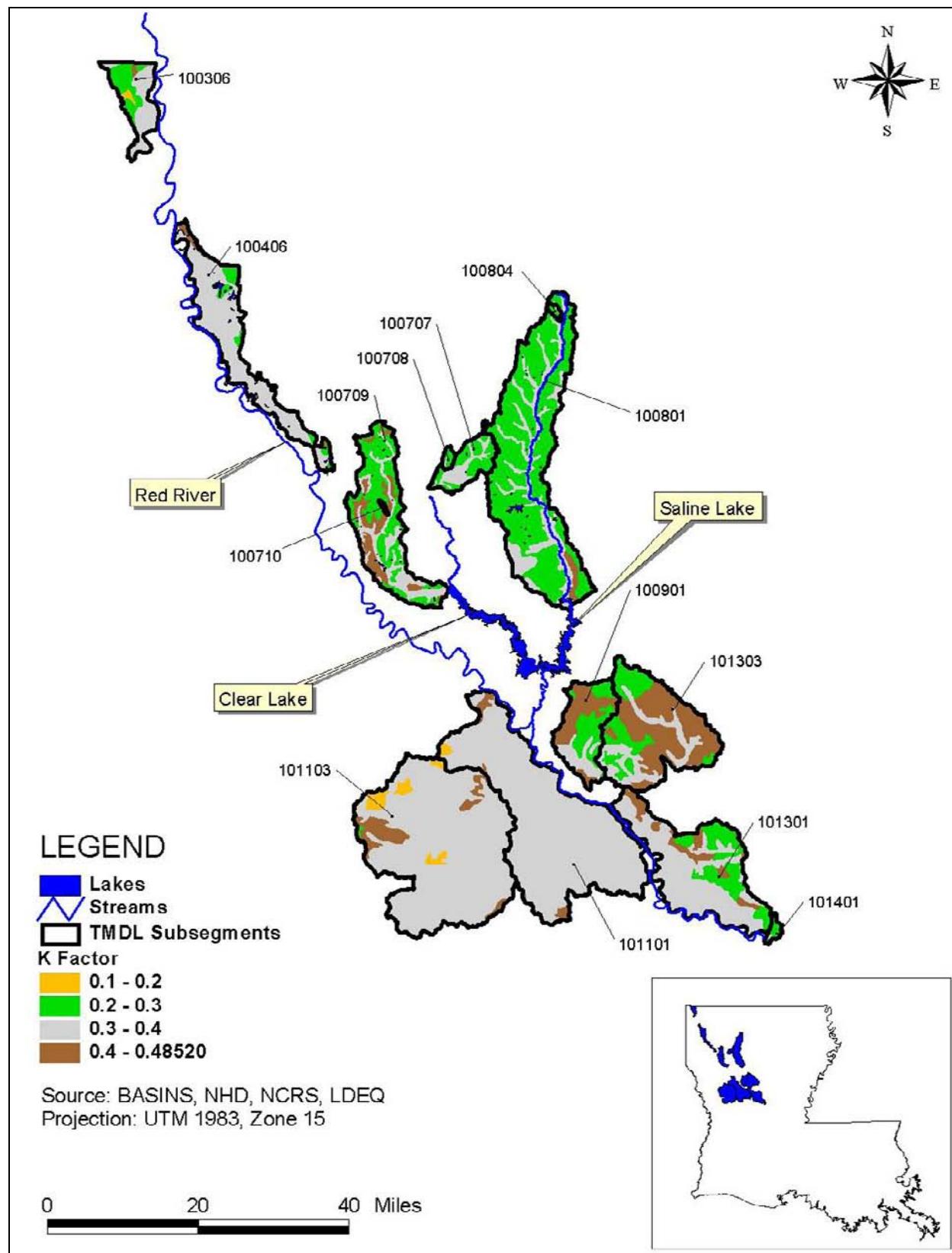


Figure 2-3. Soil K-factors in the Red River Basin subsegments.

Table 2-3. Soil properties

Subsegment	K-factor range	Surface texture	Hydrologic soil group
100306	0.1807–0.4611	silt loam, very fine sandy loam, silty clay, variable, fine sandy loam, loamy fine sand, clay, silty clay loam, gravelly fine sandy loam, loam	A, C, D
100406	0.2996–0.4698	silt loam, very fine sandy loam, silty clay, variable, fine sandy loam, clay, silty clay loam	C, D
100707	0.2016–0.3544	silt loam, very fine sandy loam, silty clay, variable, fine sandy loam, loamy fine sandy, clay, gravelly fine sandy loam, sandy loam, gravelly loamy fine sand, sandy clay loam	B, C
100708	0.2016–0.3544	silt loam, fine sandy loam, very fine sandy loam, clay, loamy fine sand, sandy loam, variable	B, C
100709	0.2651–0.4852	silt loam, fine sandy loam, very fine sandy loam, clay, loamy fine sand, sandy loam, variable, loam, silty clay loam	B, C, D
100710	0.2651–0.4346	silt loam, fine sandy loam, very fine sandy loam, loamy fine sand, variable	B, D
100801	0.2016–0.4503	silt loam, fine sandy loam, very fine sandy loam, clay, loamy fine sand, variable, loamy sand, unweathered bedrock, gravelly loamy fine sand, gravelly fine sandy loam, silty clay, sandy clay loam	B, C, D
100804	0.2469–0.3511	silt loam, fine sandy loam, very fine sandy loam, clay, loamy fine sand, sandy loam, variable, gravelly loamy fine sand, gravelly fine sandy loam	C
100901	0.2701–0.4749	silt loam, fine sandy loam, very fine sandy loam, clay, loamy fine sand, variable, loam, silty clay loam, unweathered bedrock	B, C, D
101101	0.1880–0.4588	silt loam, fine sandy loam, very fine sandy loam, loamy sand, loamy fine sand, sand, loam, silty clay loam, sandy clay loam, clay, silty clay, silty clay loam, silty loam	A, B, C, D
101103	0.1880–0.4596	silt loam, fine sandy loam, very fine sandy loam, loamy sand, loamy fine sand, sand, loam, silty clay loam, sandy clay loam, clay, silty clay, silty clay loam, gravelly fine sandy loam, clay loam	A, B, C, D
101301	0.2701–0.4815	silt loam, fine sandy loam, very fine sandy loam, loamy fine sand, clay, silty clay, silty clay loam, variable	B, C, D
101303	0.2701–0.4749	silt loam, fine sandy loam, very fine sandy loam, loamy fine sand, sand, loam, silty clay loam, clay, silty clay loam, variable, unweathered bedrock	B, C, D
101401	0.2701–0.3953	silt loam, fine sandy loam, very fine sandy loam, loamy fine sand, clay, silty clay loam, variable	B

Table 2-4. Hydrologic soil groups

Hydrologic soil group	Description
A	Soils with high infiltration rates. Usually deep, well-drained sands or gravels. Little runoff.
B	Soils with moderate infiltration rates. Usually moderately deep, moderately well-drained soils.
C	Soils with slow infiltration rates. Soils with finer textures and slow water movement.
D	Soils with very slow infiltration rates. Soils with high clay content and poor drainage. High amounts of runoff.

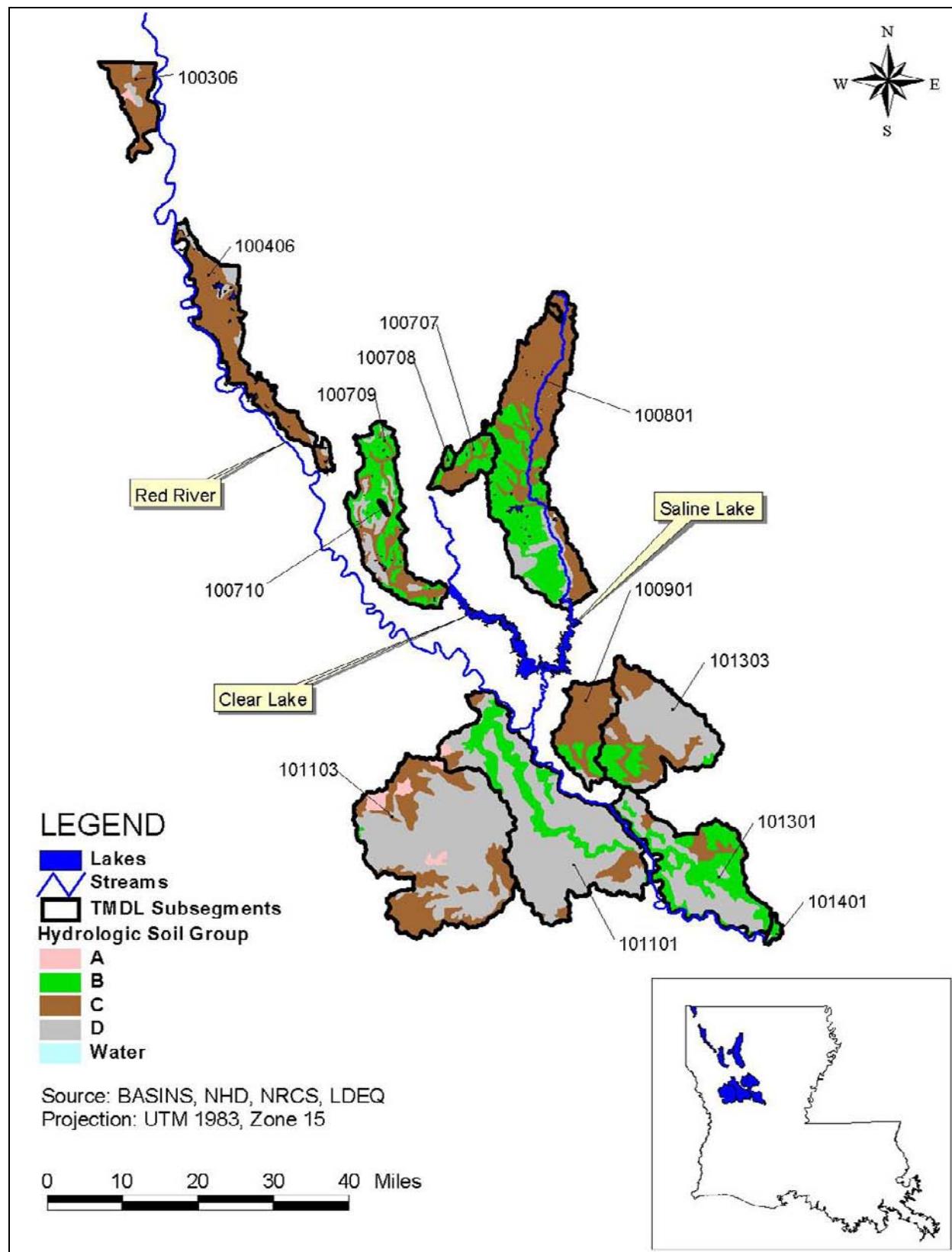


Figure 2-4. Hydrologic soil groups in the Red River Basin subsegments.

2.4 Flow Characteristics

Because there is only one active USGS flow-monitoring gage in any of the listed subsegments, flow data are not available for all the subsegments in the Red River Basin. Table 2-5 presents information for the flow gage in the listed subsegments and four nearby flow gages.

Table 2-5. USGS flow gage information for the Red River Basin

Station number	Station name	Period of record	Drainage area (square miles)
07348700	Bayou Dorcheat near Springhill, LA	10/1/1957–9/30/2003	605
07349860	Red Chute Bayou at Sligo, LA	7/10/1980–9/30/2003	980
07352000	Saline Bayou near Lucky, LA	10/1/1940–9/30/2003	154
07373000	Big Creek at Pollack, LA	1/1/1942–9/30/2002	51
08025500	Bayou Toro near Toro, LA	10/1/1955–9/30/2002	148

USGS gage 07348700 is approximately 25 miles east of subsegment 100306 (Kelly Bayou). USGS gage 07349860 is less than 2 miles east of the center of subsegment 100406 (Flat River) in the adjacent watershed. USGS gage 07352000 is in subsegment 100801 (Saline Bayou), approximately 20 miles downstream of subsegment 100804 (unnamed tributary to Saline Bayou). The gage is also approximately 4 miles east of 100707 (Castor Creek), which is adjacent to Saline Bayou, and about 18 miles east of 100709 (Grand Bayou) and 100710 (unnamed tributary to Grand Bayou). USGS gage 07373000 is about 30 miles southeast of subsegment 100901 (Bayou Nantaches), 10 miles east of subsegment 101301 (Rigolette Bayou), 21 miles southeast of subsegment 101303 (Iatt Creek), and 13 miles north of subsegment 101401 (Buhlow Creek). Finally, USGS gage 08025500 is on Bayou Toro approximately 15 miles southwest of subsegment 101103 (Kisatchie Bayou) and about 30 miles southwest of subsegment 101101 (Cane Creek). The locations of the five USGS gages are shown in Figure 2-5.

The seasonal distribution of flow at each of the five gaging stations is shown in Figures 2-6 through 2-10. Low flow occurs in the summer and early fall, and high flow tends to occur in late winter and early spring.

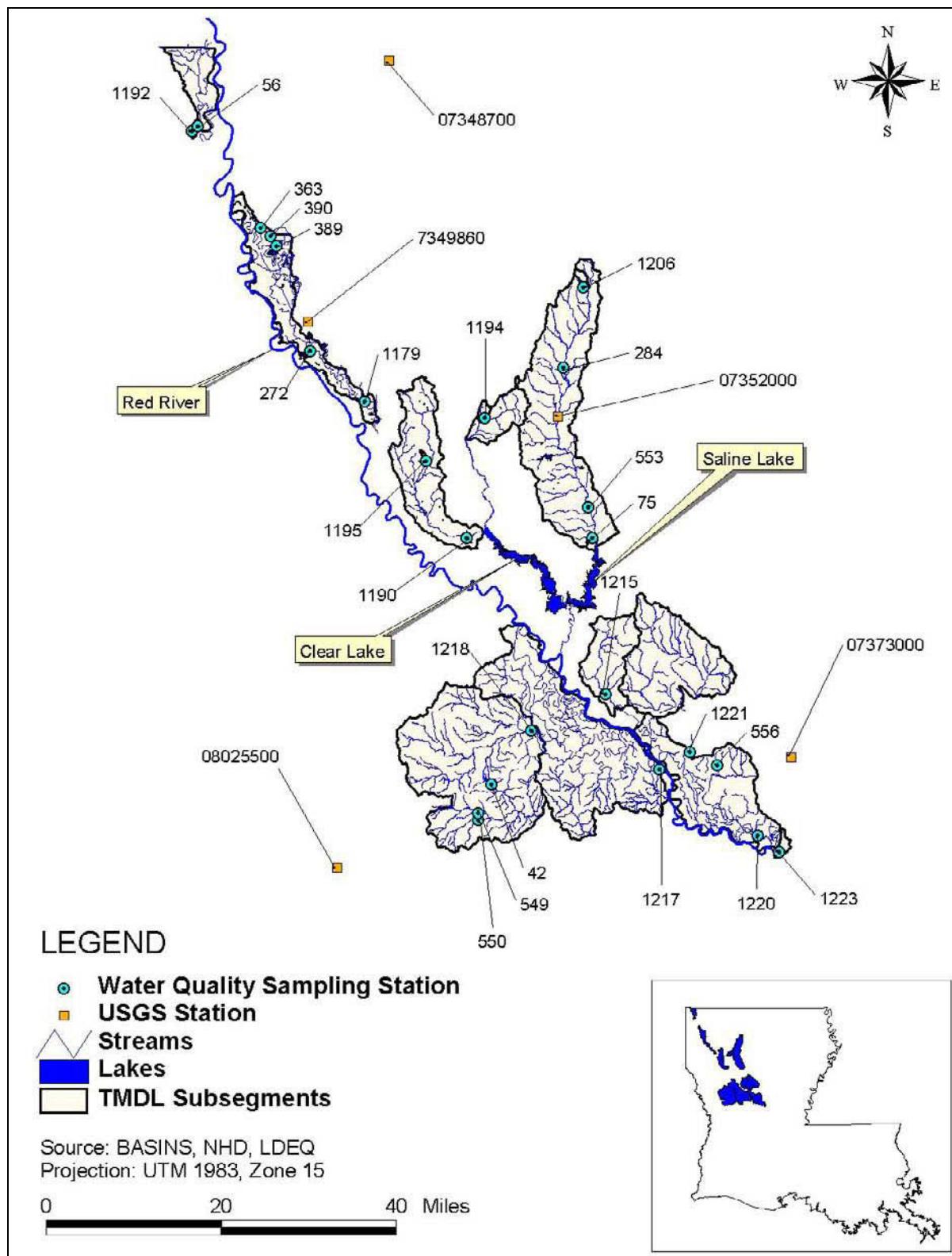


Figure 2-5. Location of USGS gages and water quality sampling stations assigned to the subsegments in the Red River Basin.

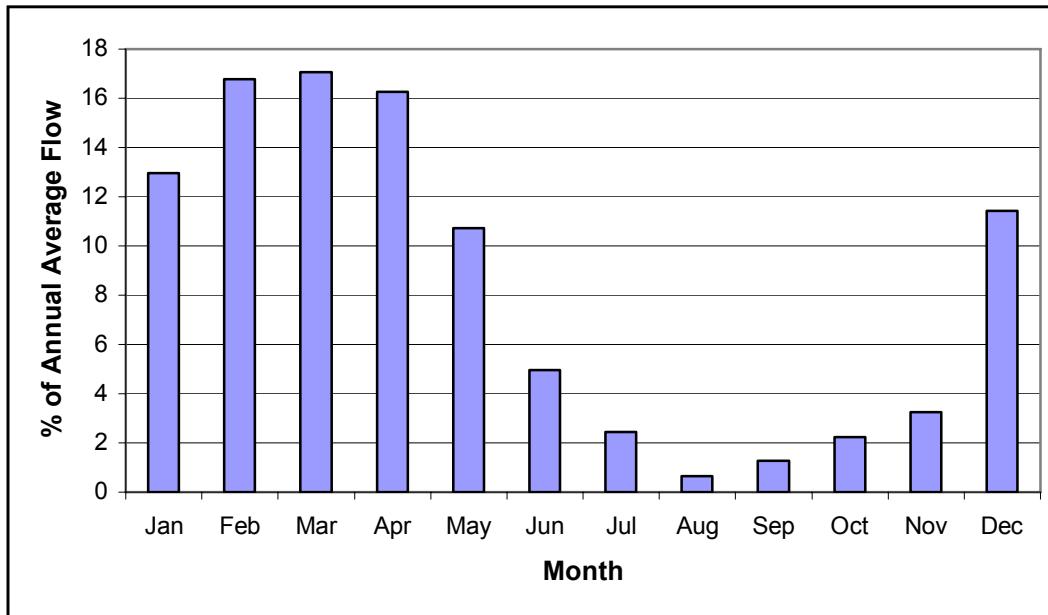


Figure 2-6. Seasonal distribution of flow at Bayou Dorcheat near Springhill, Louisiana (USGS 07348700) for 1958 through 2002.

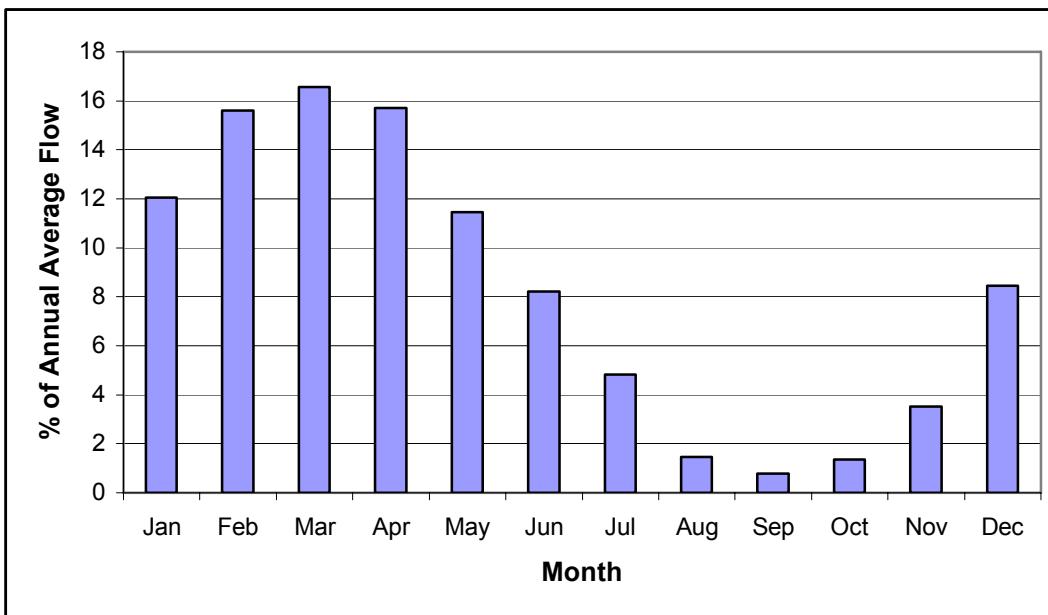


Figure 2-7. Seasonal distribution of flow at Red Chute Bayou at Sligo, Louisiana (USGS 07349860) for 1981 through 2002.

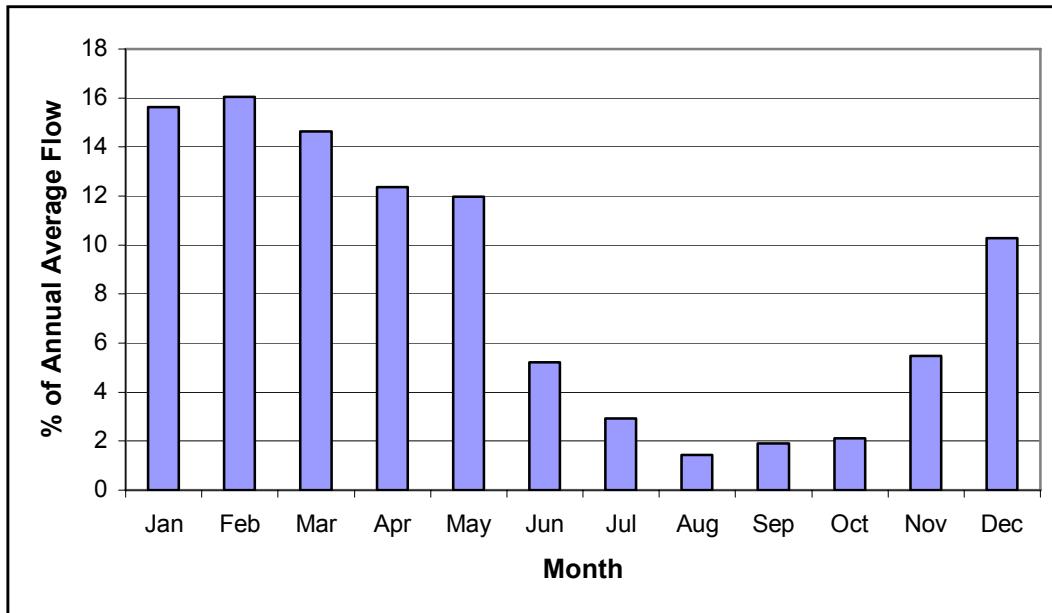


Figure 2-8. Seasonal distribution of flow at Saline Bayou near Lucky, Louisiana (USGS 07352000) for 1941 through 2002.

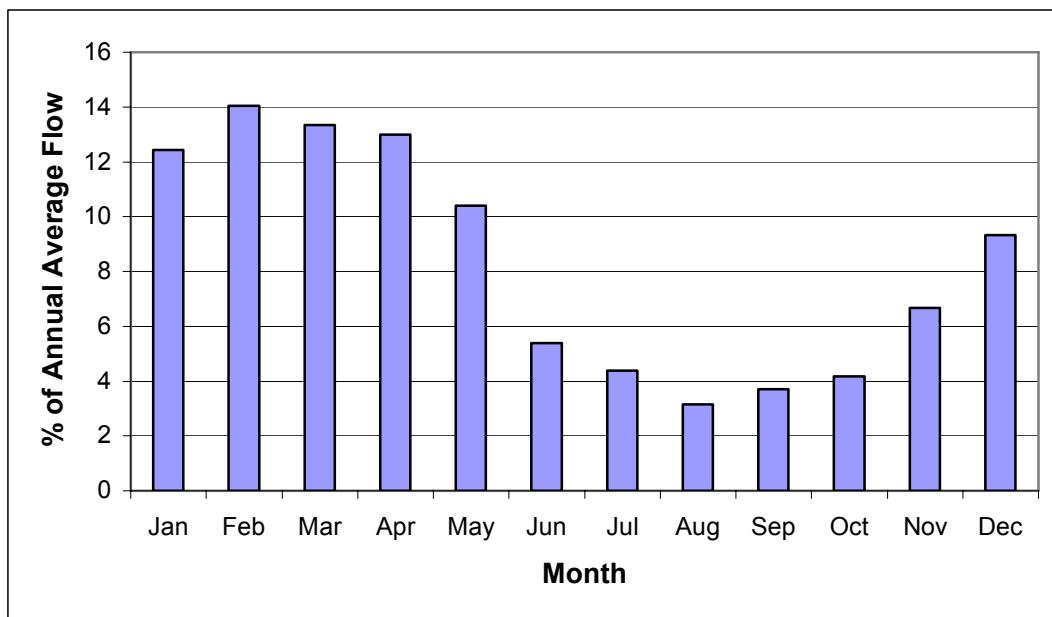


Figure 2-9. Seasonal distribution of flow at Big Creek at Pollack, Louisiana (USGS 07373000) for 1942 through 2001.

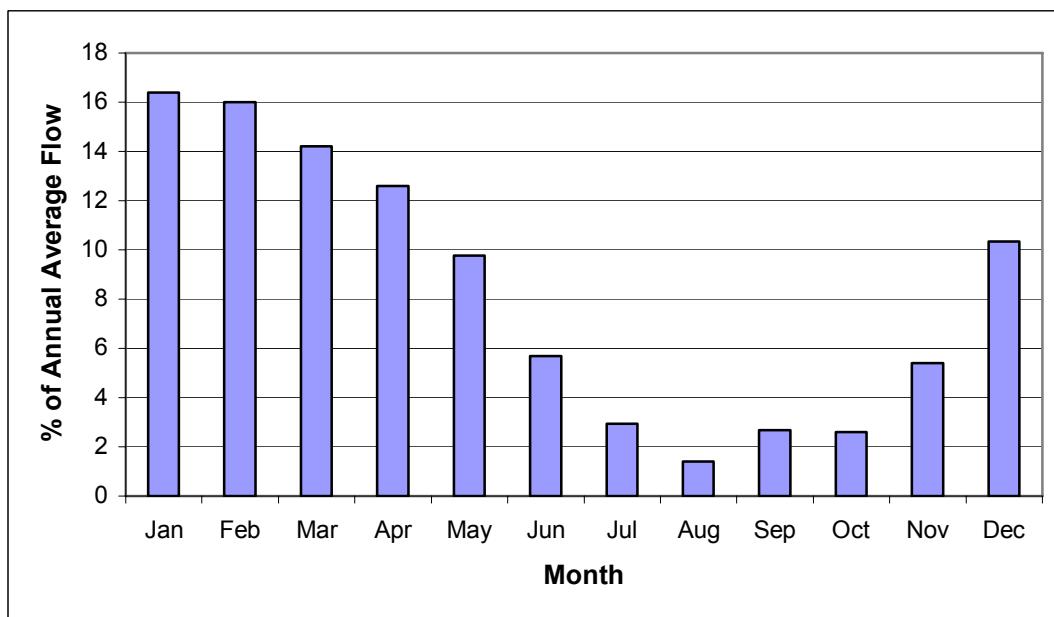


Figure 2-10. Seasonal distribution of flow at Bayou Toro near Toro, Louisiana (USGS 08025500) for 1956 through 2001.

2.5 Designated Uses and Water Quality Criteria

Louisiana's 2004 section 303(d) list indicates that the 14 listed subsegments have varied use designations, which include primary contact recreation, fish and wildlife propagation, and drinking water supply. The designated uses and water quality criteria for each of the listed pollutants are discussed below. Water quality criteria for these subsegments are presented in Table 2-6; the designated uses were presented in Table 1-1.

The numeric criteria in Table 2-6 were used in conjunction with the assessment methodology presented in LDEQ's 305(b) report (LDEQ 2002b). LDEQ's assessment methodology specifies that the fish and wildlife use must be fully supported with no more than 30 percent of values exceeding the criteria for chloride, sulfate, and TDS. For fecal coliform bacteria, the primary contact recreation and secondary contact recreation uses are to be fully supported with no more than 25 percent of the values exceeding the criteria.

Fecal Coliform Bacteria

For the eight subsegments listed for impairments due to fecal coliform bacteria, the impaired designated use is primary contact recreation. Primary contact recreation involves any recreational or other water contact use involving full-body exposure to water and considerable probability of ingesting water. Examples are swimming and water skiing. Secondary contact recreation involves activities like fishing, wading, or boating, where water contact is accidental or incidental and there is only a minimal chance of ingesting appreciable amounts of water.

Table 2-6. Numeric criteria for the subsegments of concern in the Red River Basin

Subsegment number	Subsegment name	Chloride (mg/L)	Sulfate (mg/L)	TDS (mg/L)	Turbidity (NTU)	Bacteria ^a (colonies/100 mL)
100306	Kelly Bayou					400 (5/01–10/31) 2,000 (11/01–4/30)
100406	Flat River			300		400 (5/01–10/31) 2,000 (11/01–4/30)
100707	Castor Creek					400 (5/01–10/31) 2,000 (11/01–4/30)
100708	Castor Creek tributary		9	79		
100709	Grand Bayou					400 (5/01–10/31) 2,000 (11/01–4/30)
100710	Grand Bayou tributary	26	9	79		
100801	Saline Bayou					400 (5/01–10/31) 2,000 (11/01–4/30)
100804	Saline Bayou tributary		20	250		
100901	Bayou Nantaches					400 (5/01–10/31) 2,000 (11/01–4/30)
101101	Cane River	25		100		
101103	Bayou Kisatchie			100		400 (5/01–10/31) 2,000 (11/01–4/30)
101301	Rigolette Bayou					400 (5/01–10/31) 2,000 (11/01–4/30)
101303	Iatt Creek			100		
101401	Buhlow Lake				25	

^a Criteria for primary and secondary contact recreation apply. Primary contact recreation: No more than 25 percent of the total samples collected on a monthly basis shall exceed a fecal coliform bacteria density of 400/100 mL. This shall apply only during the defined recreational period of 5/01 through 10/31. For all other periods, a fecal coliform bacteria density of 2,000/100 mL for secondary contact recreation applies.

Source: LDEQ 2005b

Primary contact water quality criteria for fecal coliform bacteria are applicable from May 1 through October 31. During the remainder of the year (November 1 through April 30), secondary contact criteria are applicable. For primary contact recreation, no more than 25 percent of the total samples may exceed a fecal coliform bacteria density of 400 colonies/100 mL. The samples should be collected on a monthly or near-monthly basis. Secondary contact criteria are similar to primary contact criteria in that no more than 25 percent of the total samples collected on a monthly or near-monthly basis may exceed a fecal coliform bacteria density of 2,000 colonies/100 mL.

Chloride

This report addresses two subsegments in the Red River Basin that are included on Louisiana's 2004 section 303(d) list for chloride. The designated uses for each of the impaired segments are fish and wildlife propagation and drinking water supply for subsegment 101101 and fish and wildlife propagation for subsegment 100710. The designated use of fish and wildlife propagation includes the use of water for aquatic habitat, food, resting, reproduction, cover, or travel corridors for any indigenous wildlife and aquatic life species associated with the aquatic environment. The use also includes maintaining water quality at a level that prevents damage to native wildlife and aquatic species associated with the aquatic environment and prevents contamination of aquatic life consumed by humans. The drinking water supply designated use includes water used for human consumption and general household use (after conventional treatment) (LDEQ 2005b).

The applicable chloride criteria for subsegments 100710 and 101101 are 26 mg/L and 25 mg/L, respectively. These criteria apply at all times. The numerical criteria for chloride generally represent the arithmetic mean of existing data from the nearest sampling location plus 3 standard deviations.

Sulfate

Three Red River Basin subsegments included on Louisiana's 2004 section 303(d) list for sulfate are addressed in this report. All three subsegments are designated for fish and wildlife propagation.

The applicable sulfate criteria for the three subsegments are 9 mg/L (100708 and 100710) and 20 mg/L (100804). These criteria apply at all times. The numerical criteria for sulfate generally represent the arithmetic mean of existing data from the nearest sampling location plus 3 standard deviations.

Total Dissolved Solids

Seven of the subsegments included on Louisiana's 2004 section 303(d) list for TDS impairments are addressed in this report (subsegments 100406, 100708, 100710, 100804, 101101, 101103, and 101303). Designated uses are fish and wildlife propagation (in subsegments 100406, 100708, 100710, 100804, 101101, 101103, and 101303) and drinking water supply (in subsegment 101101).

The applicable TDS criteria for the seven subsegments are 300 mg/L (100406), 79 mg/L (100708 and 100710), 250 mg/L (100804), and 100 mg/L (101101, 101103, and 101303). These criteria are applicable at all times. The numerical criteria for TDS generally represent the arithmetic mean of existing data from the nearest sampling location plus 3 standard deviations.

Turbidity

This TMDL report addresses only one of the subsegments listed as impaired by turbidity on Louisiana's 2004 section 303(d) list. That subsegment is 101401 (Buhlow Lake).

Louisiana's water quality standards (2005) state, “[t]urbidity other than that of natural origin shall not cause substantial visual contrast with the natural appearance of the waters of the state or impair any designated water use.” Louisiana has a numerical criterion of 25 nephelometric turbidity units (NTU) for freshwater lakes in the state, and it is applied to subsegment 101401.

Antidegradation Policy

The Louisiana water quality standards also include an antidegradation policy (*Louisiana Administrative Code [LAC]* Title 33, Part IX, Section 1109.A), which states that state waters exhibiting high water quality should be maintained at that high level of water quality. If this is not possible, water quality of a level that supports the designated uses of the waterbody should

be maintained. The designated uses of a waterbody may be changed to allow a lower level of water quality only through a use attainability study.

2.6 Point Sources

Information on point source discharges in the subsegments of concern was obtained from LDEQ files. LDEQ stores permit information using internal databases. Searches of the database yielded 33 point sources permitted to discharge fecal coliform bacteria, 26 for TDS, 3 for sulfate, 10 for chloride, and none for turbidity (Tables 2-7, 2-8, 2-9, and 2-10). Point source contributions from municipal wastewater systems are not expected to account for a large portion of the current fecal coliform bacteria loading.

Table 2-7. Point source discharge information for fecal coliform bacteria in the Red River Basin

Permit number	Facility name	Location	Outfall	Flow (gpd) ^a	Receiving water	Monthly average permit limit (colonies/100 mL)	Weekly average permit limit (colonies/100 mL)	Daily maximum permit limit (colonies/100 mL)
Subsegment 100709								
LAG380065	Fairview-Union Water System, Inc. Water Treatment Plant	3000 ft W of Hwy 507 N side of Parish Rd 110 adjacent to Grand Bayou Reservoir's spillway	1	270,591 (backwash max),	Grand Bayou		400	
				350 backwash avg				
LAG541039	Grand Bayou Reservoir Commission	LA Hwy 784, Coushatta, 71019	1	3600 (estimated avg)	Grand Bayou Reservoir	200	400	
LAG570196	South Pond	Ringgold, SEC. 10, T15N-R9W	1	< 100,000 (permitted flow)	Grand Bayou-Black Lake	200	400	
Subsegment 100801								
LA0097128	#1 Lagoon	Saline, S-27, T14N, R6W, end of Brown St	001 - Sanitary WW	37,000	Mill Creek-Saline Bayou	200	400	
				50,000 (permitted flow)				
LAG531052	Chevron Products Co. Arcadia Terminal (San D/C Only)	Arcadia 7453 Hwy 80	1	2000 avg (test)	Irrigation Sprinkler Sys on Grass		400	
				Sanitary wastewater up to 5,000				
LAG560220	Village of Saline WWTF	170 Brown St; S-27, T14n, R6w, end of Brown St	1	40,000	Mill Creek	200	400	
				< 50,000 (permitted flow)				
Subsegment 100901								
LAG570224	Montgomery, town of—Facultative Lagoon	Hwy 34	1	90,000	Nantachie Creek	200	400	
				< 100,000 (permitted flow)				
Subsegment 101301								
LA0033456	Colfax Sewage Treatment Plant	Colfax, end of Richardson Drive	1	300,000	Sugarhouse Bayou-Bayou Rigollette	200	400	
LA0099457	Dresser Valve & Control Div	Alexandria Hwy 167 N & Hwy 3225	101 - Sanitary WW	34,000	Bayou Rigollette	200	400	
LAG530502	Tioga Main K4472	Tioga, 1201 Singer Dr	1	40 (estimated max)	Bayou Rigollette-Red River		400	

Table 2-7. (continued)

Permit number	Facility name	Location	Outfall	Flow (gpd) ^a	Receiving water	Monthly average permit limit (colonies/100 mL)	Weekly average permit limit (colonies/100 mL)	Daily maximum permit limit (colonies/100 mL)
LA0039110	Aurora Park Subd	1/4 M S of US 71 & 167, off US 71	1	29,000	Creek-Rigolette	200	400	
				> 50,000 (permitted flow)	Bayou-Red River			
LAG530785	Hyams Trailer Park	Colfax, 544 Hudson Creek Rd	1	20	Hudson Creek		400	
LAG540490	Tioga Manor Nursing Home	Pineville, 5201 Shreveport Hwy	1	16,400 (estimated avg)	Ditch-Bayou Rigolette	200	400	
LAG540610	Fort Buhlow Rec. Area Phase II Proj	Pineville, 201 Recreation Rd, 71360	1	10,000 (estimated avg)	Bayou Rigolette-Red R	200	400	
LAG560004	Haphazard Mobile Home Estate	Pineville, Hickory Hill Rd	1	29,700	Ditch-Rigolette	200	400	
				< 50,000 (permitted flow)	Bayou			
LAG570042	Village of Provencal Sewer System	Provencal, East of		< 100,000 (permitted flow)	Edmund Bay-Provencal Bay-Kistachie	200	400	
Subsegment 100406								
LA0102890	Palmetto Park Oxidation Pond	Benton, S of, off Airline Dr	1 - Sanitary WW	400,000	Flat River	200	400	
LAG110003	Li Ready Mix 25 Shed Rd	Bossier City 3301 Shed Rd	102 - Treated Sanitary WW	5,000 (permitted flow)	Mack's Bayou		400	
LAG110003	Li Ready Mix 25 Shed Rd	Bossier City 3301 Shed Rd	202 - Treated Sanitary WW	5,000 (permitted flow)	Mack's Bayou		400	
LAG110144	REMCO Ready Mix	4461 Viking Dr, Bossier City, 71111	005	5,000 (permitted flow)	Mack's Bayou		400	
LAG470050	Red River Motor Co.	Bossier City 1940 Airline Hwy	005	828	Mack's Bayou		400	
LAG470050	Red River Motor Co.	Bossier City 1940 Airline Hwy	006	828	Mack's Bayou			400
LAG540038	The Winning Way Complex	Bossier 4 M N 220 on Benton Rd	001	9,700	Willow Chute Bayou	200	400	
LAG540188	Elm Grove Jr High Sch	Elm Grove, US Hwy 71, S of Bossier City, 1541old Hwy 71	001	11,420	Flat River-Loggy Bayou-Red River	200	400	
LAG540494	Maplewood Park	Bossier City, 4739 Benton Rd	001	25,000	Benoit Bayou-Alligator Bayou-Flat R	200	400	
LAG541141	Magnolia Chase Subdivision Sewage Treatment Facilities	Hwy 3	001	20,800	Willow Chute Bayou-Flat River	200	400	
				< 25,000 (permitted flow)				

TMDLs for FCB, CI, SO₄, TDS, and Turbidity for Selected Subsegments in the Red River Basin, Louisiana

Table 2-7. (continued)

Permit number	Facility name	Location	Outfall	Flow (gpd) ^a	Receiving water	Monthly average permit limit (colonies/100 mL)	Weekly average permit limit (colonies/100 mL)	Daily maximum permit limit (colonies/100 mL)
LAG541272	Eagle Water, Inc. - Haymeadow Subdivision	Hwy 3, N of	001	8,796	Williams Bayou-Willow Chute Bayou	200	400	
				< 25,000 (permitted flow)				
LAG541293	Eagle Water, Inc. - St Charles Court Sewer System - Construction	106 Decator Ct; Kingston Rd and Decatur	001	23,200	Willow Chute Bayou	200	400	
				< 25,000 (permitted flow)				
LAG560047	Haymeadow Utility Corp	Bossier City on Haymeadow Rd N of City, off Hwy 3	001	< 25,000 (permitted flow)	Williams Bayou-Willow Chute Bayou	200	400	
LAG560063	Oak Creek Development, Inc.	5201 Tara Rd, Bossier City	001	< 25,000 (permitted flow)	Willow Chute Bayou	200	400	
				< 50,000 (permitted flow)				
LAG560083	Eagle Water, Inc. - River Ridge Subdivision	end of River Rd	001	< 50,000 (permitted flow)	Flat River - Loggy Bayou	200	400	
LAG570255	Kingston Plantation Unit 2 - Construction	Kingston Rd in Bossier Parish	001	96,000	Willow Chute	200	400	
				< 100,000 (permitted flow)				

^a gpd = gallons per day

Table 2-8. Point source discharge information for total dissolved solids in the Red River Basin

Permit number	Facility name	Location	Outfall	Flow (gpd)	Receiving water
Subsegment 100406					
LA0102890	Palmetto Park Oxidation Pond	Benton, S of, off Airline Dr	1 - Sanitary WW	400,000	Flat River
LAG110003	Li Ready Mix 25 Shed Rd	Bossier City 3301 Shed Rd	102 - Treated Sanitary WW	< 5,000 (Permitted flow)	Mack's Bayou
LAG110003	Li Ready Mix 25 Shed Rd	Bossier City 3301 Shed Rd	202 - Treated Sanitary WW	< 5,000 (Permitted flow)	Mack's Bayou
LAG110144	REMCO Ready Mix	4461 Viking Dr, Bossier City, 71111	005	< 5,000 (Permitted flow)	Mack's Bayou
LAG470050	Red River Motor Co.	Bossier City, 1940 Airline Hwy	005	828	Mack's Bayou
LAG470050	Red River Motor Co.	Bossier City, 1940 Airline Hwy	006	828	Mack's Bayou
LAG540038	The Winning Way Complex	Bossier 4 M N 220 on Benton Rd	001	9,700	Willow Chute Bayou
LAG540188	Elm Grove Jr High Sch	Elm Grove, US Hwy 71, S of Bossier City, 1541 Old Hwy 71	001	11,420	Flat River-Loggy Bayou-Red River
LAG540494	Maplewood Park	Bossier City, 4739 Benton Rd	001	25,000	Benoit Bayou-Alligator Bayou-Flat R
LAG541141	Magnolia Chase Subdivision Sewage Treatment Facilities	Hwy 3	001	20,800	Willow Chute Bayou-Flat River
				< 25,000 (Permitted flow)	
LAG541272	Eagle Water, Inc. - Haymeadow Subdivision	Hwy 3 N of	001	8,796	Williams Bayou-Willow Chute Bayou
				< 25,000 (Permitted flow)	

Table 2-8. (continued)

Permit number	Facility name	Location	Outfall	Flow (gpd)	Receiving water
LAG541293	Eagle Water, Inc. - St Charles Court Sewer System - Construction	106 Decator Ct; Kingston Rd and Decatur	001	23,200	Willow Chute Bayou
				< 25,000 (Permitted flow)	
LAG560047	Haymeadow Utility Corp	Bossier City on Haymeadow Rd N of City, off Hwy 3	001	20,160	Williams Bayou-Willow Chute Bayou
				< 25,000 (Permitted flow)	
LAG560063	Oak Creek Development Inc	5201 Tara Road, Bossier City	001	< 50,000 (Permitted flow)	Willow Chute Bayou
LAG560083	Eagle Water, Inc. - River Ridge Subdivision	End of River Rd	001	< 50,000 (Permitted flow)	Flat River-Loggy Bayou
LAG570255	Kingston Plantation Unit 2 - Construction	Kingston Rd in Bossier Parish	001	96,000	Willow Chute (Permitted flow)
				< 100,000	
Subsegment 100708					
LAG560095	Castor, Village of, STP	Parish Rd 736, E of Hwy 153	001	< 50,000	Castor Creek
Subsegment 100710					
LA0064611	Hall Summit, Village of, Sewerage System	Hwy 788 & Corbitt Dr	001	Design 0.050 MGD	Grand Bayou
Subsegment 100804					
LA0038504	Arcadia, Town of: Municipal Oxidation Pond	321 Tie Mill Rd	001	design 0.500 MGD	
Subsegment 101101					
LA0098078	Natchitoches Ph Mtce Unit	Natchitoches Hwy 1 & Hwy 1 Bypass	1 - Sanitary WW	< 5,000 (Permitted flow)	Bayou Julien
LAG540047	Cedar Bend Subd Fka William & Ingram	Natchitoches off Hwy 494, on Riverview	001	3,900	Cane River
LAG540168	B&D Country Estates	Natchitoches, 1901 Hwy 1 South #465	001	18,000	Cane River
LAG540220	Cane River Apartments	Cloutierville, on School St, off La 495	001	8,800	Cane River
LAG540969	Highway 6 Trailer Park	Natchitoches 4431 Hwy 6 W of Town	001	6,000	Youngs Bayou-Bayou Boulet De Canon
LAG541068	Chopin Plywood Plant - 002	Chopin, W of Bayou Barbue, on Hwy 490e	002	10,000	Bayou Barbue
LAG541069	Pecan Grove Estates Mobile Home Park	Natchitoches, 298 Vienna Rd	001	9,000 avg.; 18,000 max.	Ditch To Bayou Poisson
LAG560008	Cedar Grove Subdivision	Natchitoches, off Hwy 494, Cedar Grove Dr	001	52,200	Cane River
				< 100,000 (Permitted flow)	
LAG560013	Point Place Subdivision	Natchitoches, off Hwy 494, on Marie St	001	29,200	Cane River
				< 50,000 (Permitted flow)	
LAG570099	Payne Subdivision	Natchitoches, off Hwy 6, on Payne Dr	001	67,200	Cane River
				< 100,000 (Permitted flow)	

Table 2-9. Point source discharge information for sulfate in the Red River Basin

Permit number	Facility name	Location	Outfall	Flow (gpd)	Receiving water
Subsegment 100708					
LAG560095	Castor, village of—STP	Parish Rd 736, E of Hwy 153	001	< 50,000	Castor Creek
Subsegment 100710					
LA0064611	Hall Summit, Village of, Sewerage System	Hwy 788 & Corbitt Dr	001	Design 0.050 MGD	Grand Bayou
Subsegment 100804					
LA0038504	Arcadia, town of—Municipal Oxidation Pond	321 Tie Mill Rd	001	500,000	

Table 2-10. Point source discharge information for chloride in the Red River Basin

Permit number	Facility name	Location	Outfall	Flow (gpd)	Receiving water
Subsegment 100710					
LA0064611	Hall Summit, Village of, Sewerage System	Hwy 788 & Corbitt Dr	001	Design 0.050 MGD	Grand Bayou
Subsegment 101101					
LA0098078	Natchitoches Ph Mtce Unit	Natchitoches, Hwy 1 & Hwy 1 Bypass	1 - Sanitary WW	(Permitted flow = 5,000)	Bayou Julien
LAG540047	Cedar Bend Subd Fka William & Ingram	Natchitoches, off Hwy 494, on Riverview	001	3,900	Cane River
LAG540168	B&D Country Estates	Natchitoches, 1901 Hwy 1 South #465	001	18,000	Cane River
LAG540220	Cane River Apartments	Cloutierville, on School St, off LA 495	001	8,800	Cane River
LAG540969	Highway 6 Trailer Park	Natchitoches, 4431 Hwy 6 W of Town	001	6,000	Youngs Bayou-Bayou Boulet De Canon
LAG541068	Chopin Plywood Plant - 002	Chopin, W of Bayou Barbue, on Hwy 490e	002	10,000	Bayou Barbue
LAG541069	Pecan Grove Estates Mobile Home Park	Natchitoches, 298 Vienna Rd	001	9,000 avg.; 18,000 max.	ditch to Bayou Poisson
LAG560008	Cedar Grove Subdivision	Natchitoches, off Hwy 494, Cedar Grove Dr	001	52,200 (Permitted flow = < 100,000)	Cane River
LAG560013	Point Place Subdivision	Natchitoches, off Hwy 494, on Marie St	001	29,200 (Permitted flow = < 50,000)	Cane River
LAG570099	Payne Subdivision	Natchitoches, off Hwy 6, on Payne Dr	001	67,200 (Permitted flow = < 100,000)	Cane River

Phase I and II stormwater systems are another possible point source contributor in the Red River Basin. Stormwater discharges are generated by runoff from urban land and impervious areas such as paved streets, parking lots, and rooftops during precipitation events. These discharges often contain high concentrations of pollutants that can eventually enter nearby waterbodies. Most stormwater discharges are considered point sources and require coverage by a National Pollutant Discharge Elimination System (NPDES) permit.

Under the NPDES stormwater program, operators of large, medium, and regulated small municipal separate storm sewer systems (MS4s) must obtain authorization to discharge pollutants. The Stormwater Phase I Rule (*55 Federal Register 47990*, November 16, 1990) requires all operators of medium and large MS4s to obtain an NPDES permit and develop a stormwater management program. Medium and large MS4s are defined by the size of the population within the MS4 area, not including the population served by combined sewer systems. A medium MS4 has a population size between 100,000 and 249,999. A large MS4 has a population of 250,000 or more.

Phase II requires a select subset of small MS4s to obtain an NPDES stormwater permit. A small MS4 is any MS4 not already covered by the Phase I program as a medium or large MS4. The Phase II Rule automatically covers all small MS4s in urbanized areas (UAs), as defined by the Bureau of the Census, and also includes small MS4s outside a UA that are so designated by NPDES permitting authorities, case by case (USEPA 2000).

In Louisiana, there are two ways that an MS4 can be identified as a regulated small MS4. This category includes all cities within UAs and any small MS4 area outside UAs with a population of at least 10,000 and a population density of at least 1,000 people per square mile (LDEQ 2002a). Table 2-11 presents MS4 information by subsegment for the Red River Basin.

Table 2-11. MS4 information for the Red River Basin

NPDES permit number	Authority	Discharge subsegment	Subsegment name	Urban area (acres)	Subsegment area (acres)
LAR041029	Natchitoches, city of	101101	Cane River	5,909	215,078

2.7 Nonpoint Sources

Fecal Coliform Bacteria

Louisiana's 2004 section 303(d) list identifies managed pasture grazing, wildlife other than waterfowl, and natural conditions as the suspected nonpoint sources of the fecal coliform bacteria impairment in the Red River Basin subsegments. Additional potential sources of fecal coliform bacteria not included on the section 303(d) list are failing septic or sewer systems. The subsegments with managed pasture identified as the potential source contain pasture/hay land use areas of 18.1 percent (subsegment 100306), 17.1 percent (subsegment 100406), and 1.5 percent (subsegment 101103). Managed pasture grazing involves livestock production in managed grasslands, which are usually used for hay production as well. The subsegments that have identified wildlife and natural conditions as the potential source are dominated by forest (83.2 [100707], 65.3 [100709], and 81.4 [100801] percent), which provides more habitat for nonaquatic wildlife than do nonforested watersheds and might account for the increased fecal coliform bacteria loads from wildlife.

Chloride

The state's section 303(d) list identifies natural conditions as potential nonpoint sources of chloride in the Red River Basin. Additional sources are unknown. Typically, sources of dissolved minerals include urban and agricultural runoff, forestry, and natural geology. Chloride is found in all human and animal wastes, and therefore septic systems and areas where animal wastes are deposited can be chloride sources. Fertilizers are also a common source of chlorides (University of Florida 2003).

Sulfate

The state's section 303(d) list identifies natural conditions as potential nonpoint sources of sulfate in the Red River Basin. Additional sources are unknown. Sulfate is a naturally occurring mineral in some soils and rock formations. Sources of dissolved minerals often include urban and agricultural runoff, forestry, and geology.

Total Dissolved Solids

The state's section 303(d) list identifies residential districts and natural conditions as potential nonpoint sources of TDS in the Red River Basin. Additional sources are unknown. TDS can originate from natural sources (e.g., mineral springs, carbonate deposits, salt deposits, seawater intrusion) and urban and agricultural runoff (Wilkes University 2005). LDEQ's 2000 *Nonpoint Source Annual Report* suggests that soil erosion is a major problem in subsegment 100406 (Flat River), along with nutrients related to fertilizer usage (LDEQ 2000a). The Flat River watershed is mostly cropland with some pasture/hay areas.

Turbidity

This report addresses only one subsegment listed for turbidity, 101401 (Buhlow Lake). The state's section 303(d) list identifies natural conditions as the suspected source. LDEQ officials suspect that the turbidity impairment in Buhlow Lake is due to recent construction in the watershed. A fun-park for children was recently constructed near the lake, and a number of new homes were built along Rocky Bayou, which is a tributary to Buhlow Lake. There has also been new road construction in the watershed. All this construction is nearly completed, and LDEQ expects that the turbidity levels in the lake will soon return to their previous levels and will once again meet the turbidity criteria (Bob Paul, LDEQ Kisatchie Regional Office, personal communication, July 26, 2005).

3 CHARACTERIZATION OF EXISTING WATER QUALITY

3.1 Comparison of Observed Data to Criteria

Fecal Coliform Bacteria

Of the eight subsegments listed for fecal coliform bacteria impairments on Louisiana's 2004 section 303(d) list, only three have observations at more than one water quality station; the other five subsegments have only one data set per subsegment. Table A-1 in Appendix A presents a summary of the observations at each water quality station by subsegment, including the number of observations; the minimum, maximum, and median observations; the number of exceedances of the criteria; and the percentage of observations exceeding the criteria at each station. Appendix B contains the original water quality data.

The station with the most fecal coliform bacteria observations is station 42 on subsegment 101103 (Bayou Kisatchie), with 213 observations collected between 1978 and 1998. The fewest observations at any station is 12 at stations 1192 (subsegment 100306), 1189 (subsegment 100707), 1190 (subsegment 100709), 1215 (subsegment 100901), and 1220 (subsegment 101301).

Exceedances of the summer primary contact recreation criterion (400/100 mL) from May 1 through October 31 were observed at all stations, with the highest percentage of exceedances (50 percent) at station 1189 in subsegment 100707 (Castor Creek). The other exceedances range from 17 to 37 percent.

Four of the eight subsegments have exceedances of the winter criterion (2,000/100 mL), which is applied from November 1 through April 30. The highest percentage of winter exceedances is 16 percent at station 56 on Kelly Bayou. The lowest percentage of winter exceedances is 2 percent at station 75 on Saline Bayou. Station 272 on the Flat River has the largest single sample concentration,¹ with an observation of 240,000/100 mL in August 1994.

Chloride

One chloride data set is available for each of the chloride-impaired subsegments addressed in this TMDL report. Water quality station 1195 has chloride observations for subsegment 100710 (Grand Bayou Tributary), and station 1217 has observations on the Cane River in subsegment 101101. Table A-2 in Appendix A presents a summary of the observations at each water quality station by subsegment, including the number of observations; the minimum, maximum, and median observations; the number of exceedances of the criteria; and the percentage of observations exceeding the criteria at each station. Appendix B contains the original water quality data.

Station 1195 has nine observations from January to December 2002, and 56 percent of the observations exceed the 26 mg/L chloride criterion for the unnamed tributary. Station 1217 has

¹ This result is the largest that was specifically identified. Several sample concentrations were given as "greater than" a certain concentration, and the actual concentration could be larger than the one listed here as the largest.

16 observations from January 2002 through April 2004, and 31 percent of the observations exceed the 25 mg/L chloride criterion for the Cane River.

Sulfate

One sulfate data set is available for each of the sulfate-impaired subsegments addressed in this TMDL report. Water quality station 1194 has sulfate observations for subsegment 100708 (unnamed tributary of Castor Creek), station 1195 has observations for subsegment 100710 (unnamed tributary of Grand Bayou), and station 1206 has observations for subsegment 100804 (unnamed tributary of Saline Bayou). Table A-3 in Appendix A presents a summary of the observations at each water quality station by subsegment, including the number of observations; the minimum, maximum, and median observations; the number of exceedances of the criteria; and the percentage of observations exceeding the criteria at each station. Appendix B contains the original water quality data.

All three stations have sulfate observations for January through December of 2002. Stations 1194 and 1195 each have 9 observations, while station 1206 has 12 observations. Station 1195 has the highest percentage of exceedances of the criterion (78 percent). Stations 1194 and 1206 have exceedances of 67 percent and 75 percent, respectively.

Total Dissolved Solids

Of the seven TDS-impaired subsegments addressed in this report, two have four water quality stations with TDS observations. The remaining subsegments have one station each. Table A-4 in Appendix A presents a summary of the observations at each water quality station by subsegment, including the number of observations; the minimum, maximum, and median observations; the number of exceedances of the criteria; and the percentage of observations exceeding the criteria at each station. Appendix B contains the original water quality data.

All but two of the stations show TDS observations that exceed the TDS criterion for each subsegment. The two stations that do not have exceedances are 549 and 550 in subsegment 101103 (Kisatchie Bayou), but there are only two observations at each of these stations. The highest percentage of exceedances was observed at station 1195 on subsegment 100710 (unnamed tributary to Grand Bayou). All nine of the observations at station 1195, sampled during 2002, exceed the 79 mg/L criterion for subsegment 100710. The smallest percentage of exceedances is 33 percent at station 1206 in subsegment 100804 (unnamed tributary to Saline Bayou).

Turbidity

There is one water quality station (1223) for subsegment 101401 (Buhlow Lake), which is included on Louisiana's 2004 section 303(d) list for turbidity impairment. Table A-5 in Appendix A presents a summary of the observations at station 1223, including the number of observations; the minimum, maximum, and median observations; the number of exceedances of the criteria; and the percentage of observations exceeding the criteria at the station. Appendix B contains the original water quality data.

There are 12 turbidity observations at station 1223 for the period of record January through December 2002. The maximum observation is 69 NTU, and the minimum is 19 NTU. Seventy-five percent of the turbidity observations at station 1223 exceed the 25 NTU turbidity criterion for Buhlow Lake.

3.2 Trends and Patterns in Observed Data

Fecal Coliform Bacteria

Because of the limited number of samples at most of the water quality stations, no distinct trends or patterns were seen in the fecal coliform bacteria data results. The highest fecal coliform bacteria concentrations were observed during the summer months and usually during low-flow conditions, but not many samples were collected during high-flow periods for comparison. Higher concentrations would be expected at high-flow conditions after a precipitation event when the fecal coliform bacteria have the potential to be washed off the pastureland into the waterbody. Appendix C contains the fecal coliform bacteria sampling results plotted over time and versus flow.

Chloride

The chloride observations at station 1195 in subsegment 100710 (unnamed tributary to Grand Bayou) do not show any strong trends or patterns, but the highest observations tended to be in the winter and early spring months of 2002. There is no trend related to streamflow. However, the chloride observations at station 1217 in subsegment 101101 (Cane River) show a strong relationship with flow. The highest concentrations were consistently observed at lower flows. Appendix D contains the chloride sampling results plotted over time and versus flow.

Sulfate

Stations 1194 and 1195 at subsegments 100708 and 100710, respectively, both show higher sulfate concentrations during the winter than during the summer, but there is no strong correlation with flow. Station 1206 on subsegment 100804 shows no seasonal trends, but there is a correlation with higher concentrations at lower flows. Appendix E contains the sulfate sampling results plotted over time and versus flow.

TDS

In general, most of the water quality stations in subsegments listed for TDS did not show strong seasonal or hydrologic trends. Stations 272 (subsegment 100406), 1206 (subsegment 100804), 1217 (subsegment 101101), and 42 (subsegment 101103) did show an increase in TDS concentrations at lower flows, but not many observations were made at higher flows for comparison. Appendix F contains the TDS sampling results plotted over time and versus flow.

Turbidity

Station 1223 at Buhlow Lake (subsegment 101401) showed higher turbidity observations in the late summer and winter months during the samples that were collected (January through December 2002). Because of the limited number of samples (only 12), however, no other distinct trends or patterns were seen in the data. Appendix G contains the turbidity sampling results plotted over time and versus flow.

4 TMDL DEVELOPMENT

A TMDL is the total amount of a pollutant that can be assimilated by the receiving waterbody while still achieving water quality standards. In TMDL development, allowable loadings from all pollutant sources that cumulatively amount to no more than the TMDL must be established and thereby provide the basis for establishing water quality-based controls.

A TMDL for a given pollutant and waterbody is composed of the sum of individual wasteload allocations (WLAs) for point sources, and load allocations (LAs) for nonpoint sources and natural background levels. In addition, the TMDL must include an implicit or explicit margin of safety (MOS) to account for the uncertainty in the relationship between pollutant loads and the quality of the receiving waterbody. This TMDL also includes a future growth (FG) component to account for loadings from the continued growth in the TMDL area. The TMDL components are illustrated using the following equation:

$$TMDL = \sum WLAs + \sum LAs + MOS + FG$$

For some pollutants, TMDLs are expressed on a mass loading basis (e.g., kilograms per day). For bacteria, however, TMDLs can be expressed in terms of organism counts (or resulting concentration), in accordance with 40 CFR 130.2(l).

4.1 TMDL Analytical Approach

The methodology used to determine the TMDL for each impaired subsegment is the load duration curve. Because loading capacity varies as a function of the flow present in the stream, these TMDLs represent a continuum of desired loads over all flow conditions, rather than a fixed single value. The basic elements of this procedure are documented on the Kansas Department of Health and Environment Web site (KDHE 2003). This method was used to illustrate allowable loading for a wide range of flows. The steps for how this methodology was applied for the TMDLs in this report can be summarized as follows:

1. Develop a flow duration curve.
2. Convert the flow duration curve to load duration curves for each impairment.
3. Plot observed loads with load duration curves.
4. Calculate TMDL, MOS, FG, WLA, and LA (see Section 4.2).
5. Calculate percent reductions required to meet water quality standards.

Flow Duration Curve

A flow per unit area duration curve was developed for each USGS gage for the TMDLs. Daily streamflow measurements from USGS gages for each data set were sorted in increasing order, and the percentile ranking of each flow was calculated. For fecal coliform bacteria, the daily streamflow measurements from USGS gages were separated into summer (May through October) and winter (November through April) data sets to accommodate for the state's seasonal criteria. The load duration methodology requires that the same flow period be used for both developing the flow duration and calculating observed loads from sampling data. For each

season, the flows per unit area were then plotted against the corresponding percent flow that exceeds a specific flow to create the flow duration curves.

Figure 4-1 is an example of a flow duration curve. The plot shows the flow per unit area (e.g., cubic feet per second per square mile) on the Y-axis. The X-axis shows the percentage of days on which the plotted flow is exceeded. Points at the lower end of the plot (0 through 10 percent) represent high-flow conditions where only 0 through 10 percent of the flow exceeds the plotted point. Conversely, points on the high end of the plot (90 to 100 percent) represent low-flow conditions.

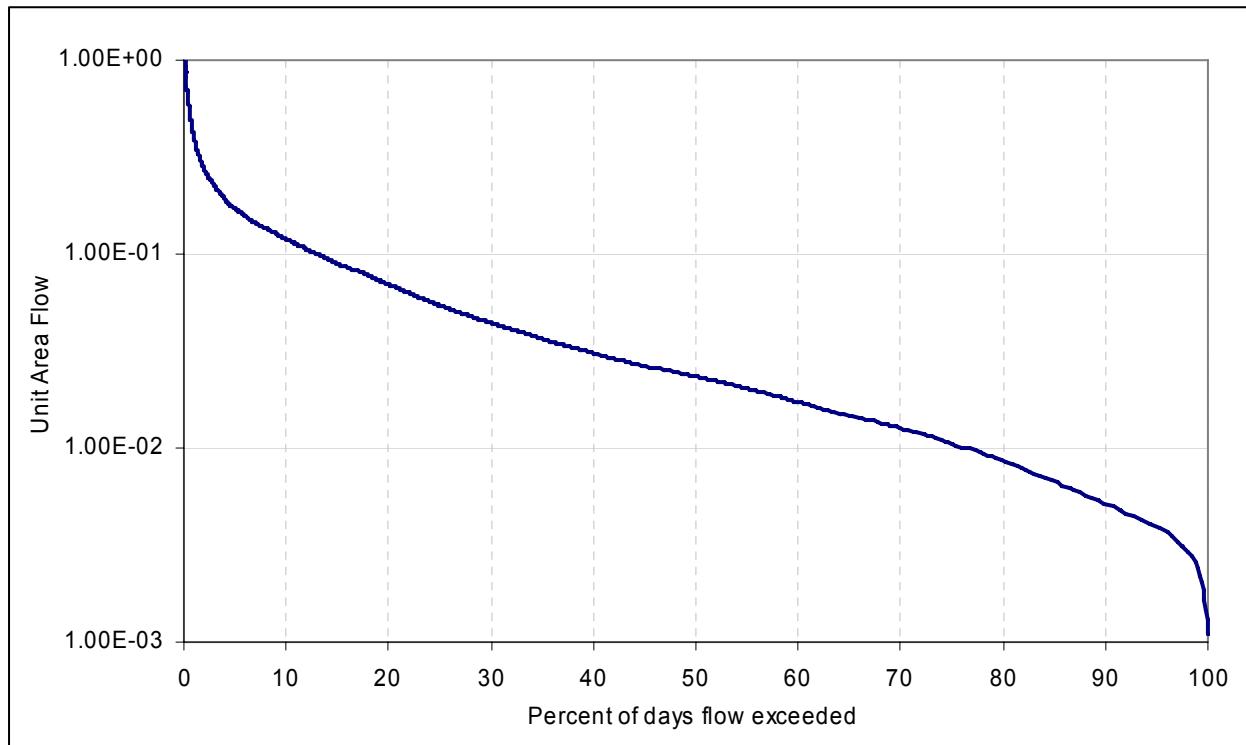


Figure 4-1. Example of a load duration curve.

Because there was only one active USGS gage in the area of concern, four other nearby gages in similar watersheds were assigned to each subsegment to represent flow. Many USGS gages in the area were not used because their period of record did not intersect the period of record for the water quality data. Other USGS gages were not used because they were not representative of the subsegments of interest. Table 4-1 presents each USGS gage that was used, the period of record used in the TMDL analysis, and the subsegment(s) represented.

For the TMDL calculations, the most recent flow data were used. Data from 1980 through 2003 were used for USGS gages 07373000 and 08028000. For USGS gages 07348700 and 07352000, data for some recent water years (1993 and 1996) were missing. Data from 1962 through 2002 were used to maintain the quality assurance guidelines of 95 percent data completeness. USGS gage 0737860 had a period of record of 1980 through 2003; however, the completeness of the data did not meet quality assurance guidelines. Some recent water years (1993 and 1996) were

missing, and the gage had only 90 percent data completeness. Nevertheless, this information was used in the TMDL calculations because it was the best available data.

Table 4-1. USGS flow gages and represented subsegments for the Red River Basin

Station number	Station name	Period of record used in TMDL development	Subsegments represented
07348700	Bayou Dorcheat near Springhill, LA	1/1/1980–9/30/2003	100306
07349860	Red Chute Bayou at Sligo, LA	7/10/1980–9/30/2003	100406
07352000	Saline Bayou near Lucky, LA	1/1/1980–9/30/2003	100707, 100708, 100709, 100710, 100801, 100804
07373000	Big Creek at Pollack, LA	1/1/1980–9/30/2002	100901, 101301, 101303, 101401
08025500	Bayou Toro near Toro, LA	1/1/1980–9/30/2002	101101, 101103

Load Duration Curve

For each TMDL parameter (TSS, chloride, TDS, and sulfates) and each season for fecal coliform bacteria, the flows per unit area from the flow duration curves were multiplied by the appropriate target concentration (Table 2-6) to compute an allowable load per unit area duration curve. Each load duration curve is a plot of mass per day per subsegment area versus the percent flow exceedance from the flow duration curves. Because the load duration curves were expressed by unit of drainage area, each curve was assumed applicable at all sampling stations and for all stream reaches in that subsegment.

The load duration curve is beneficial when analyzing monitoring data with their corresponding flow information plotted as a load. This approach allows the monitoring data to be placed in relation to their place in the flow continuum. Assumptions of the probable source or sources of the impairment can then be made from the plotted data. The load duration curve shows the calculation of the TMDL at any flow rather than at a single critical flow. The official TMDL number is reported as a single number, but the curve is provided to demonstrate the value of the acceptable load at any flow. This will allow analysis of load cases in the future for different flow regimes.

Because turbidity is a measure of the water's optical properties that cause light to be scattered or absorbed, the load duration curve and the percent reduction were based on a surrogate parameter, TSS. Turbidity can be affected by different suspended particles such as clay, silt, and microorganisms, many of which are the same substances that form TSS. Turbidity can also be affected by algae and water color; however, for these TMDLs, TSS is assumed the dominant source of turbidity. Because Louisiana has not developed numeric criteria for TSS, a regression analysis of turbidity and TSS data was performed. Only one subsegment, 101401, is listed for turbidity. The regression equation ($y = 0.9243x + 8.0405$, where x is TSS and y is turbidity) had an R^2 value of 0.66. This value demonstrates that there is a correlation between turbidity and TSS, albeit not strong one, and that TSS can be used as a surrogate.

For TMDL calculations (Appendix H), the calculated TSS endpoint was compared to existing TSS data. Results from these calculations are used in this report and as the loads assigned to the

watersheds. An alternative method of determining the TMDL and percent reduction is to use TSS concentrations that are calculated the same way the end point is. TMDLs and percent reductions were calculated this way, and provided similar, often identical, loads and percent reductions. These calculations are included in Appendix H for comparison.

Observed Loads

For each sampling station (and season for fecal coliform bacteria), observed loads were calculated by multiplying the observed concentration of the parameter of concern by the flow per unit area on the sampling day. These observed loads were then plotted versus the percent flow exceedance of the flow per unit area on the sampling day and placed on the same plot as the load duration curve. Reductions were applied to the observed loads for each parameter until its water quality criteria and allowable percent exceedance were met to obtain an overall percent reduction for each subsegment. These plots are shown in the appendices of this report as follows:

- Appendix H: Load Duration Calculations for all TMDLs (CD-ROM)
- Appendix I: Load Duration Curve Summaries and Plots for Total Suspended Solids
- Appendix J: Load Duration Curve Summaries and Plots for Chloride
- Appendix K: Load Duration Curve Summaries and Plots for Total Dissolved Solids
- Appendix L: Load Duration Curve Summaries and Plots for Sulfate
- Appendix M: Load Duration Curve Summaries and Plots for Fecal Coliform Bacteria: Summer
- Appendix N: Load Duration Curve Summaries and Plots for Fecal Coliform Bacteria: Winter

These plots provide visual comparisons between observed and allowable loads under different flow conditions. Observed loads that are plotted above the load duration curve represent conditions where observed water quality concentrations exceed the target concentrations. Observed loads plotted below the load duration curve represent conditions where observed water quality concentrations were less than target concentrations (i.e., not exceeding water quality standards).

4.2 TMDL, WLA, and LA

Each TMDL was calculated as the area under the load duration curve. Because the load duration curves were expressed in mass per unit drainage area, the area under the curve was multiplied by the estimated subsegment area, which was assumed to represent the drainage area for the subsegment. Table 4-2 presents the TMDLs and allocations for the subsegments in this report.

Both section 303(d) of the Clean Water Act and the regulations at 40 CFR 130.7 require that TMDLs include an MOS to account for uncertainty in available data or in the actual effect that controls will have on the loading reductions and receiving water quality. The MOS may be expressed explicitly as unallocated assimilative capacity or implicitly using conservative assumptions in establishing the TMDL. For a more detailed discussion of the MOS, see Section 4.4. In addition to the MOS, an FG component was added for an additional MOS to account specifically for future growth in the TMDL area (see Section 4.5).

Table 4-2. Summary of fecal coliform bacteria TMDLs, MOS, FG, WLAs, and LAs for the Red River Basin

Subsegment	Station	Season	Percent reduction	Total allowable load	Explicit MOS (10%)	Future growth (10%)	Σ WLA	Σ LA
				1×10^9 cfu/day				
100306	56	Summer	54.4	21.76	2.18	2.18	0.00	17.40
100306	56	Winter	0.0	372.30	37.23	37.23	0.00	297.84
100406	272	Summer	48.6	62.32	6.23	6.23	5.90	43.95
100406	272	Winter	0.0	602.60	60.26	60.26	5.90	476.18
100707	1189	Summer	55.0	17.52	1.75	1.75	0.00	14.02
100707	1189	Winter	0.0	291.16	29.12	29.12	0.00	232.93
100709	1190	Summer	28.0	64.88	6.49	6.49	0.79	51.11
100709	1190	Winter	0.0	1,083.34	108.33	108.33	0.79	865.89
100801	75	Summer	0.0	144.65	14.47	14.47	0.86	114.86
100801	75	Winter	0.0	2,415.52	241.55	241.55	0.86	1,931.55
100901	1215	Summer	77.5	56.33	5.63	5.63	0.76	44.30
100901	1215	Winter	0.0	632.08	63.21	63.21	0.76	504.91
101103	1218	Summer	77.5	205.84	20.58	20.58	0.00	164.67
101103	1218	Winter	0.0	2,991.37	299.14	299.14	0.00	2,393.09
101301	1220	Summer	0.0	129.85	12.98	12.98	4.12	99.76
101301	1220	Winter	0.0	1,457.13	145.71	145.71	4.12	1,161.58

Table 4-3. Summary of chloride and sulfate TMDLs, MOS, FG, WLAs, and LAs for the Red River Basin

Subsegment	Station	Pollutant	Percent reduction	Total allowable load	Explicit MOS (10%)	Future growth (10%)	Σ WLA	Σ LA
				kg/day				
100710	1195	Chloride	59.2	10.24	1.02	1.02	4.92	3.27
101101	1217	Chloride	51.9	2,374.26	237.43	237.43	80.78	1,818.63
100708	1194	Sulfate	54.5	10.88	1.09	1.09	1.70	7.00
100710	1195	Sulfate	85.9	3.54	0.35	0.35	1.70	1.13
100804	1206	Sulfate	0.0	51.33	5.13	5.13	37.85	3.21

Table 4-4. Summary of TDS and TSS TMDLs, MOS, FG, WLAs, and LAs for the Red River Basin

Subsegment	Station	Pollutant	Percent reduction	Total allowable load	Explicit MOS (10%)	Future growth (10%)	Σ WLA	Σ LA
				ton/day				
100406	389	TDS	48.7	9.70	0.97	0.97	0.95	6.81
100708	1194	TDS	43.6	0.09	0.01	0.01	0.02	0.05
100710	1195	TDS	65.3	0.03	0.00	0.00	0.02	0.01
100804	1206	TDS	51.9	0.71	0.07	0.07	0.52	0.04
101101	1217	TDS	76.6	10.47	1.05	1.05	0.36	8.02
101103	42	TDS	76.7	11.34	1.13	1.13	0.00	9.08
101303	1222	TDS	63.4	4.36	0.44	0.44	0.00	3.49
101401	1223	Tur/TSS	43.3	0.04	Implicit	0.00	0.00	0.03

Hurricane Katrina made landfall on Monday, August 29, 2005, as a Category 4 hurricane. The storm brought heavy winds and rain to southeast Louisiana, breaching several levees and

flooding up to 80 percent of New Orleans and large areas of coastal Louisiana. Much of the area that was flooded during Hurricane Katrina was flooded again by the storm surge from Hurricane Rita. Both Hurricanes Katrina and Rita have caused a significant amount of change in sedimentation and water quality in southern Louisiana. Many wastewater treatment facilities were temporarily or permanently damaged. Some wastewater treatment facilities will be rebuilt, while others will be relocated. The hurricanes expedited the loss of coastal land and modified the hydrology of some of the coastal waterbodies. Several federal and state agencies including EPA and LDEQ are engaged in collecting environmental data and assessing the recovery of the Gulf of Mexico waters. The proposed TMDLs in this report were developed on the basis of pre-hurricane conditions. Therefore, post-hurricane conditions and other factors could delay the implementation of these proposed TMDLs, render some proposed TMDLs obsolete, or could require modifications of the TMDLs. While hurricane effects may be valid for some TMDLs, any deviation from the TMDLs should be justified using site-specific data and/or information.

Much of coastal Louisiana was built by the process of delta formation through flooding and deposition of sediments by the rise and fall of the Mississippi River. According to EPA's present knowledge, extensive areas of wetlands and coastal marshes are affected by a high rate of subsidence and degradation, primarily due to a lack of historical sediment and nutrients entering the wetlands. Subsidence is a natural process, but the building of levee systems has restricted the Mississippi River's course and, therefore, is preventing the natural cycle of the river and the natural process of delta formation. According to EPA, a large portion of the state's coastal wetlands have undergone and continue to undergo severe deprivation of sediments and nutrients that has led to the breakup of the natural system. In addition, EPA believes that many of Louisiana's wetlands have become isolated from the riverine sources that created them and are becoming stagnant and starved for nutrients and organic and inorganic sediments. Note that restoring these eroding wetlands involves supplying nutrients to these areas through managed Mississippi River diversions.

According to EPA's understanding, if any future diversion from the Mississippi River or other tributaries will increase flow, the nonpoint source load allocation and TMDLs will also be increased proportionately. From EPA's current understanding, the diversion projects are supported by both state and federal agencies, including EPA and the U.S. Army Corps of Engineers (USACE). The diversions are managed by the USACE and the state, and the projects include post-diversion monitoring to determine effectiveness of the project and to monitor water quality conditions.

Wasteload Allocation

The WLA portion of the TMDL equation is the total loading of a pollutant that is assigned to point sources. The point sources in the Red River Basin include wastewater facilities and MS4s. Wasteload allocations are based on the current permit limits and discharge flow levels.

No domestic wastewater facilities with permit limits for chloride, sulfate, or TDS could be found in the Red River Basin, although it is possible that discharges from such facilities could have slightly elevated levels of these parameters. Therefore, these facilities were given WLAs using facility flow and water quality criteria. As long as point source discharges of treated wastewater

contain parameter levels at or below these permit limits, they should not be a cause of exceedances of water quality criteria.

Note that because area normalized flow is small in three subsegments (100708, 100710, and 100804), which have large permitted flows, an additional flow was added to the area normalized flow. This additional flow was set equal to the permitted flow in the point sources in the particular subsegment to account for the large permitted flow that was not previously taken into account. The flow was added because of several factors that include the relatively small size of the subsegment and the relative magnitude of the estimated effluent concentration compared to the water quality criteria. The stream water quality criteria for certain parameters are low compared to observed levels of the domestic wastewater facilities, which were used to derive the effluent concentrations used in this TMDL.

No nondomestic wastewater facilities with permit limits for chloride, sulfate, or TDS are in these subsegments. Therefore, it was assumed that none of these facilities has elevated concentrations and no WLAs were assigned. No wastewater facilities were included in the TMDL for turbidity because it appears that the only facilities that contribute to turbidity are small or remote and, therefore, are not significant.

For fecal coliform bacteria, LDEQ's policy is to set wastewater permit limits no higher than water quality criteria (i.e., criteria are met at end-of-pipe). As long as point source discharges of treated wastewater contain parameter levels at or below these permit limits, they should not be a cause of exceedances of the fecal coliform bacteria water quality criteria. Therefore, no change in the permit limits is required. Tables 4-5 through 4-8 list the individual fecal coliform bacteria, chloride, sulfate, and TDS WLAs for each point source in the Red River Basin.

EPA's stormwater permitting regulations require municipalities to obtain permit coverage for all stormwater discharges from MS4s. For the MS4 in the basin, a gross MS4 load was computed by multiplying the LA by the ratio of the MS4 area in each subsegment to the subsegment area in the Red River Basin. Note that these values are estimates that can be refined in the future as more information about the MS4s and land use-specific loadings information becomes available. Note also that the MS4 loads presented reflect only that portion of the MS4 in the subsegment. The computed MS4 load was subtracted from the LA and included as a WLA component of the TMDL because MS4s are permitted dischargers but function similarly to nonpoint sources through storm-driven processes. Table 4-9 lists the individual WLAs for the MS4 identified in Section 2.6 (Table 2-11). EPA expects that the MS4 wasteload allocations will be achieved through best management practices (BMPs) and adaptive management.

Load Allocation

The LA is the portion of the TMDL assigned to natural background loadings as well as nonpoint sources such as septic tank leakage, wildlife, and agricultural practices. For this TMDL that LA was calculated by subtracting the WLA, MOS, and FG from the total TMDL. LAs were not allocated to separate nonpoint sources, due to the lack of available source characterization data. The LAs are presented in Tables 4-2 and 4-3.

Table 4-5. Fecal coliform bacteria WLAs for the Red River Basin

Permit Number	Outfall	Permitted flow (gpd)	Fecal coliform monthly avg (colonies/ 100 mL) ^a	Fecal coliform weekly avg (cfu/100 mL) ^a	Fecal coliform daily max (cfu/100 mL) ^a	Fecal load (1×10^6 cfu/day) ^a
Subsegment 100406						
LA0102890	1	400,000	200	400	--	3,028.00
LAG110003	102	5,000	--	400	--	75.70
LAG110003	202	5,000	--	400	--	75.70
LAG110144	005	5,000	--	400	--	75.70
LAG470050	005	828	--	400	--	12.54
LAG470050	006	828	--	--	400	12.54
LAG540038	001	9,700	200	400	--	73.43
LAG540188	001	11,420	200	400	--	86.45
LAG540494	001	25,000	200	400	--	189.25
LAG541141	001	25,000	200	400	--	189.25
LAG541272	001	25,000	200	400	--	189.25
LAG541293	001	25,000	200	400	--	189.25
LAG560047	001	25,000	200	400	--	189.25
LAG560063	001	50,000	200	400	--	378.50
LAG560083	001	50,000	200	400	--	378.50
LAG570255	001	100,000	200	400	--	757.00
						Total 5,900.30
Subsegment 100709						
LAG380065	001	350	--	400	--	5.30
LAG541039	001	3,600	200	400	--	27.25
LAG570196	001	100,000	200	400	--	757.00
						Total 789.55
Subsegment 100801						
LA0097128	001	50,000	200	400	--	378.50
LAG531052	001	5,000	--	400	--	75.70
LAG531052	001	2,000	--	400	--	30.28
LAG560220	001	50,000	200	400	--	378.50
						Total 862.98
Subsegment 100901						
LAG570224	001	100,000	200	400	--	757.00
						Total 757.00
Subsegment 101301						
LA0033456	001	300,000	200	400	--	2,271.00
LA0039110	001	50,000	200	400	--	378.50
LA0099457	101	18,000	200	400	--	136.26
LAG530502	001	40	--	400	--	0.61
LAG530785	001	20	--	400	--	0.30
LAG540490	001	16,400	200	400	--	124.15
LAG540610	001	10,000	200	400	--	75.70
LAG560004	001	50,000	200	400	--	378.50
LAG570042		100,000 ^b	200 ^b	400 ^b	--	757.00
						Total 4,122.02

Table 4-5. (continued)

^a Monthly average permit limits, when applicable, were used to calculate the load. When permit does not have a monthly average permit limit, the weekly average permit limit was used. If the facility has neither a monthly nor a weekly limit, the daily maximum limit was used to calculate loads.

^b This flow is standard for general permits with this number. Permit limits are general permit limits for monthly average and daily maximum in summer.

Table 4-6. Chloride WLAs for the Red River Basin

Permit number	Outfall	Permitted flow (gpd)	Estimated chloride limit (mg/L)	Chloride load (kg/day)
Subsegment 100710				
LA0064611	001	50,000	26	4.9
				Total 4.9
Subsegment 101101				
LA0098078	1	5,000	25	0.5
LAG540047	001	3,900	25	0.4
LAG540168	001	18,000	25	1.7
LAG540220	001	8,800	25	0.8
LAG540969	001	6,000	25	0.6
LAG541068	002	10,000	25	0.9
LAG541069	001	9,000	25	0.9
LAG560008	001	100,000	25	9.5
LAG560013	001	50,000	25	4.7
LAG570099	001	100,000	25	9.5
				Total 29.4

Table 4-7. Sulfate WLAs for the Red River Basin

Permit number	Outfall	Permitted flow (gpd)	Estimated sulfate limit (mg/L)	Sulfate loading (kg/day)
Subsegment 100708				
LAG560095	001	50,000	9	1.7
				Total 1.7
Subsegment 100710				
LA0064611	001	50,000	9	1.7
				Total 1.7
Subsegment 100804				
LA0038504	001	500,000	20	37.9
				Total 37.9

Table 4-8. TDS WLAs for the Red River Basin

Permit number	Outfall	Permitted flow (gpd)	Estimated TDS limit (mg/L)	TDS load (tons/day)
Subsegment 100406				
LA0102890	1	400,000	300	0.501
LAG110003	102	5,000	300	0.006
LAG110003	202	5,000	300	0.006
LAG110144	005	5,000	300	0.006
LAG470050	005	828	300	0.001

Table 4-8. (continued)

Permit number	Outfall	Permitted flow (gpd)	Estimated TDS limit (mg/L)	TDS load (tons/day)
LAG470050	006	828	300	0.001
LAG540038	001	9,700	300	0.012
LAG540188	001	11,420	300	0.014
LAG540494	001	25,000	300	0.031
LAG541141	001	25,000	300	0.031
LAG541272	001	25,000	300	0.031
LAG541293	001	25,000	300	0.031
LAG560047	001	25,000	300	0.031
LAG560063	001	50,000	300	0.063
LAG560083	001	50,000	300	0.063
LAG570255	001	100,000	300	0.125
Total				0.955
Subsegment 100708				
LAG560095	001	50,000	79	0.016
Total				0.016
Subsegment 100710				
LA0064611	001	50,000	79	0.016
Total				0.016
Subsegment 100804				
LA0038504	001	500,000	250	0.522
Total				0.522
Subsegment 101101				
LA0098078	1 - Sanitary WW	5,000	100	0.002
LAG540047	001	3,900	100	0.002
LAG540168	001	18,000	100	0.008
LAG540220	001	8,800	100	0.004
LAG540969	001	6,000	100	0.003
LAG541068	002	10,000	100	0.004
LAG541069	001	9,000	100	0.004
LAG560008	001	100,000	100	0.042
LAG560013	001	50,000	100	0.021
LAG570099	001	100,000	100	0.042
Total				0.130

Table 4-9. Chloride and TDS WLAs for MS4s for the Red River Basin

Subsegment	Subsegment name	Pollutant	NPDES permit number	Authority	MS4 WLA	WLA units
101101	Cane River	Chloride	LAR041029	Natchitoches, city of	51.38	kg/day
101101	Cane River	TDS	LAR041029	Natchitoches, city of	0.23	ton/day

4.3 Seasonality and Critical Conditions

The federal regulations at 40 CFR 130.7 require that TMDLs include seasonal variations and take into account critical conditions for streamflow, loading, and water quality parameters. For this TMDL, fecal coliform bacteria loadings for subsegments with primary contact recreation as the designated use were determined for winter and summer on the basis of seasonal water quality criteria, thus accounting for seasonality. In addition, the sampling results for all pollutants were plotted over time and reviewed for any seasonal patterns (see Section 3.2).

By accounting for critical conditions, the TMDL makes sure that water quality standards are maintained for infrequent occurrences and not only for average conditions. For fecal coliform bacteria, the water quality criteria include values that must not be exceeded more than 25 percent of the time (primary and secondary contact recreation).

Because of the way the criteria are written (i.e., including critical and noncritical conditions), the TMDL for the pollutant of concern can be developed by reviewing pollutant loads at all flow conditions within applicable periods of the year and evaluating the percentage of values exceeding the criteria. The load duration curve, which determines the allowable loading at a wide range of flows, was chosen as the approach for these TMDLs (see Section 4.1). Therefore, the TMDLs were calculated at all flows rather than at a single critical flow.

4.4 Margin of Safety

The MOS is the portion of the pollutant loading reserved to account for any uncertainty in the data. There are two ways to incorporate the MOS (USEPA 1991). One way is to implicitly incorporate it by using conservative model assumptions to develop allocations. The other way is to explicitly specify a portion of the TMDL as the MOS and use the remainder for allocations. For all pollutants except turbidity in this analysis, the MOS is explicit: 10 percent of each targeted TMDL was reserved as the MOS to account for any uncertainty in the TMDL. Using 10 percent of the TMDL load provides an additional level of protection to the designated uses of the subsegments of concern. For the turbidity TMDL, an implicit MOS was incorporated by using conservative assumptions. The primary conservative assumption was calculating the turbidity TMDLs assuming that TSS is a conservative parameter and does not settle out of the water column.

4.5 Future Growth

While the MOS is an allocation for scientific uncertainty, FG is an allocation for growth. Ten percent of the load was allocated for FG in the area that is covered by the TMDL. This includes future urban development, including point sources and MS4 areas and agricultural and other typical nonpoint source contributing areas. The FG could also be used for unaccounted or unknown sources not included in the TMDL.

5 FUTURE WATERSHED ACTIVITIES

5.1 TMDL Implementation Strategies

WLAs will be implemented through Louisiana Pollutant Discharge Elimination System (LPDES) permit procedures.

LAs will be addressed through the LDEQ Nonpoint Source Management Program. Louisiana's *Nonpoint Source Management Plan* (LDEQ 2000b) states that TMDLs are being developed through a close relationship between LDEQ and EPA Region 6. It further states that, "[m]anagement strategies outlined within this document (both statewide and watershed) will be implemented in each of the watersheds where water quality problems have been attributed to nonpoint sources of pollution." On page ii, Objective 3 of the watershed management strategies is to, "utilize pollutant load reductions of the TMDL to develop nonpoint source pollution reduction strategies for each of the watersheds...that have water quality problems identified." In addition, Objective 7 provides a tracking process for evaluating progress in reducing loadings of fecal coliform bacteria.

The plan includes a discussion of a number of nonpoint source activities and provides BMPs that can be used to achieve the nonpoint source load reductions established in the TMDLs. The plan broadly discusses programs to address agriculture, forestry, home sewer treatment systems, hydromodification, urban runoff, construction, and resource extraction. Provided with each BMP is an evaluation of the effectiveness of the BMP, given as a high, medium, or low ranking. Additional evaluations should be conducted to determine the most likely source of impairment in this watershed and to identify localized hot spots to be targeted for effective BMP implementation. These and other BMPs may be implemented at a scale adequate to achieve the load reductions established in the TMDL.

5.2 Water Quality Monitoring Activities

LDEQ uses funds provided under section 106 of the Clean Water Act and under the authority of the Louisiana Environmental Quality Act to run a program for monitoring the quality of the state's surface waters. The LDEQ Surveillance Section collects surface water samples at various locations using appropriate sampling methods and procedures to ensure the quality of the data collected. The objectives of the surface water monitoring program are to determine the quality of the state's surface waters, develop a long-term database for water quality trend analysis, and monitor the effectiveness of pollution controls. The data obtained through the surface water monitoring program are used to develop the state's biennial section 305(b) report (*Water Quality Inventory*) and the section 303(d) list of impaired waters. This information is also used to establish priorities for LDEQ's nonpoint source program.

LDEQ has implemented a watershed approach to surface water quality monitoring. Through this approach, the entire state is sampled on a 4-year cycle. Long-term trend monitoring sites at various locations on the larger rivers and Lake Pontchartrain are sampled throughout the 4-year cycle. Sampling is conducted monthly to yield approximately 12 samples per site during each year the site is monitored. Sampling sites are located where they are considered representative of

the waterbody. Under the current monitoring schedule, approximately one-half of the state's waters are newly assessed for section 305(b) and section 303(d) listing purposes for each biennial cycle, with sampling occurring statewide each year. The 4-year cycle follows an initial 5-year rotation that covered all basins in the state according to the TMDL priorities. Monitoring will allow LDEQ to determine whether there has been any improvement in water quality following implementation of the TMDLs. As the monitoring results are evaluated at the end of each year, waterbodies may be added to or removed from the section 303(d) list of impaired waterbodies.

6 PUBLIC PARTICIPATION

Federal regulations require EPA to notify the public and seek comment concerning TMDLs it prepares. This TMDL was developed under contract to EPA, and EPA held a public review period seeking comments, information, and data from the public and any other interested parties. The notice for the public review period was published in the *Federal Register* on July 20, 2006, and the review period closed on August 21, 2006. Additional comments will be collected through October 20, 2006. These comments will be reviewed, and these TMDLs may be revised if appropriate.

Comments were received from LDEQ, the Gulf Restoration Network, and six individuals. Comments and additional information submitted during this public comment period were used to inform or revise this TMDL. The comments and responses to these TMDLs will be included in a separate report that will include comments on similar TMDLs with the same public review period.

EPA will submit the final TMDL to LDEQ for implementation and incorporation into LDEQ's current water quality management plan.

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Appendix A

Summary of Water Quality Data

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TMDLs for FCB, Cl, SO₄, TDS, and Turbidity for Selected Subsegments in the Red River Basin, Louisiana

Table A-1. Summary of fecal coliform bacteria data for the Red River Basin

Station number	Station name	Period of record	Number of observations	Minimum MPN/100ml	Maximum MPN/100ml	Mean MPN/100ml	Median MPN/100ml	Number of observations above criterion ^a	% of observations above criterion ^a
May 1 through October 31									
Subsegment 100306									
56	Kelly Bayou near Hosston, LA	5/8/78–10/9/89	64	8	24,000	1900	225	23	36%
1192	Kelly Bayou at Huckaby Road, south of Hosston, LA	5/6/02–10/7/02	6	110	1,600	458	205	2	33%
Subsegment 100406									
272	Flat River east of Taylortown, LA	6/11/90–10/15/02	29	8	240,000	9230	220	10	34%
363	Flat River Drainage Canal north of Bossier City, LA	No Data							
389	Flat River Drainage Canal NE of Bossier City, LA	No Data							
390	Flat River Drainage Canal NE of Shreveport, LA	No Data							
Subsegment 100707									
1189	Castor Creek at Highway 507, southwest of Castor, LA	5/13/02–10/14/02	6	50	1,600	578	400	3	50%

Table A-1. (continued)

Station number	Station name	Period of record	Number of observations	Minimum MPN/100ml	Maximum MPN/100ml	Mean MPN/100ml	Median MPN/100ml	Number of observations above criterion ^a	% of observations above criterion ^a
Subsegment 100709									
1190	Grand Bayou at Highway 507, north of Fairview Alpha, LA	5/13/02–10/14/02	6	17	1,600	433	215	2	33%
Subsegment 100801									
75	Saline Bayou near Goldonna, LA	6/12/78–10/7/02	105	1	16,000	843	140	19	18%
284	Saline Bayou east of Bienville, LA	6/11/90–10/14/97	24	7	1,100	202	85	4	17%
553	Saline Bayou near Goldonna, LA	No Data							
Subsegment 100901									
1215	Nantachie Creek east of Montgomery, LA	5/20/02–10/21/02	6	23	1,600	592	150	2	33%
Subsegment 101103									
42	Kisatchie Bayou near Lotus, LA	5/9/78–10/13/97	107	7	9,400	649	170	31	29%
549	Kisatchie Bayou at Kisatchie, LA	No Data							
550	Little Sandy Creek at Kisatchie, LA	No Data							
1218	Kisatchie Bayou south of Cypress, LA	5/20/02–10/21/02	6	30	1,600	650	270	2	33%

TMDLs for FCB, CI, SO₄, TDS, and Turbidity for Selected Subsegments in the Red River Basin, Louisiana

Table A-1. (continued)

Station number	Station name	Period of record	Number of observations	Minimum MPN/100ml	Maximum MPN/100ml	Mean MPN/100ml	Median MPN/100ml	Number of observations above criterion ^a	% of observations above criterion ^a
Subsegment 101301									
556	Cress Creek west of Oak Grove, LA	No Data							
1220	Rigolette Bayou northwest of Pineville, LA	5/21/02–10/22/02	6	4	2,400	509	72	2	33%
November 1 through April 30									
Subsegment 100306									
56	Kelly Bayou near Hosston, LA	4/11/78–12/11/89	62	13	13,000	1,008	150	10	16%
1192	Kelly Bayou at Huckaby Road, south of Hosston, LA	1/8/02–12/2/02	6	30	500	173	110	0	0%
Subsegment 100406									
272	Flat River east of Taylortown, LA	2/12/90–12/10/02	32	8	22,000	1428	120	4	13%
363	Flat River Drainage Canal north of Bossier City, LA	No Data							
389	Flat River Drainage Canal NE of Bossier City, LA	No Data							

Table A-1. (continued)

Station number	Station name	Period of record	Number of observations	Minimum MPN/100ml	Maximum MPN/100ml	Mean MPN/100ml	Median MPN/100ml	Number of observations above criterion ^a	% of observations above criterion ^a
390	Flat River Drainage Canal NE of Shreveport, LA	No Data							
Subsegment 100707									
1189	Castor Creek at Highway 507, southwest of Castor, LA	1/14/02–12/9/02	6	110	1,600	568	335	0	0%
Subsegment 100709									
1190	Grand Bayou at Highway 507, north of Fairview Alpha, LA	1/14/02–12/9/02	6	11	240	79	38	0	0%
Subsegment 100801									
75	Saline Bayou near Goldonna, LA	11/13/78–12/2/02	100	10	9,200	312	130	2	2%
284	Saline Bayou east of Bienville, LA	2/13/90–4/14/98	25	6	11,000	715	79	2	8%
553	Saline Bayou near Goldonna, LA	No Data							
Subsegment 100901									
1215	Nantachie Creek east of Montgomery, LA	1/28/02–12/16/02	6	30	300	132	130	0	0%

Table A-1. (continued)

Station number	Station name	Period of record	Number of observations	Minimum MPN/100ml	Maximum MPN/100ml	Mean MPN/100ml	Median MPN/100ml	Number of observations above criterion ^a	% of observations above criterion ^a
Subsegment 101103									
42	Kisatchie Bayou near Lotus, LA	4/11/78–4/14/98	106	8	9,000	565	130	9	8%
549	Kisatchie Bayou at Kisatchie, LA	No Data							
550	Little Sandy Creek at Kisatchie, LA	No Data							
1218	Kisatchie Bayou south of Cypress, LA	1/28/02–2/4/04	8	80	500	254	205	0	0%
Subsegment 101301									
556	Cress Creek west of Oak Grove, LA	No Data							
1220	Rigolette Bayou northwest of Pineville, LA	1/22/02–12/17/02	6	9	1,600	325	23	0	0%

^a Primary contact recreation water quality criteria for fecal coliform bacteria: No more than 25 percent of the total samples collected on a monthly or near-monthly basis shall exceed a fecal coliform density of 400/100mL from May 1 through October 31. During the nonrecreational period of November 1 through April 30, the criteria for secondary contact recreation shall apply (no more than 25 percent of the total samples collected on a monthly or near-monthly basis shall exceed a fecal coliform density of 2,000/100mL).

Table A-2. Summary of chloride data for the Red River Basin

Station number	Station name	Period of record	Number of observations	Minimum (mg/l)	Maximum (mg/l)	Mean (mg/l)	Median (mg/l)	Number of observations above criterion ^a	% of observations above criterion ^a
Subsegment 100710									
1195	Unnamed tributary of Grand Bayou near Hall Summit, LA	1/15/02–12/10/02	9	15.6	57.3	35.6	36.1	5	56%
Subsegment 101101									
1217	Cane River west of Colfax, LA	1/28/02–4/20/04	16	3.9	46.8	16.7	11.15	5	31%

^a The water quality criteria for chloride in the Red River Basin are as follows:

Subsegment 100710: 26 mg/L

Subsegment 101101: 25 mg/L

Table A-3. Summary of sulfate data for the Red River Basin

Station number	Station name	Period of record	Number of observations	Minimum (mg/l)	Maximum (mg/l)	Mean (mg/l)	Median (mg/l)	Number of observations above criterion ^a	% of observations above criterion ^a
Subsegment 100708									
1194	Unnamed tributary of Castor Creek near Castor, LA	1/14/02–12/9/02	9	2.6	163	10	92	6	67%
Subsegment 100710									
1195	Unnamed tributary of Grand Bayou near Hall Summit, LA	1/15/02–12/10/02	9	6.4	26.5	14.8	11	7	78%
Subsegment 100804									
1206	Unnamed tributary of Saline Bayou near Arcadia, LA	1/14/02–12/9/02	12	4.5	123	38	33.25	9	75%

^a The water quality criteria for sulfate in the Red River Basin are as follows:

Subsegment 100708: 9 mg/L

Subsegment 100710: 9 mg/L

Subsegment 100804: 20 mg/L

Table A-4. Summary of total dissolved solids data for the Red River Basin

Station number	Station name	Period of record	Number of observations	Minimum (mg/l)	Maximum (mg/l)	Mean (mg/l)	Median (mg/l)	Number of observations above criterion ^a	% of observations above criterion ^a
Subsegment 100406									
272	Flat River east of Taylortown, LA	2/12/90–12/10/02	61	114	754	398	392	43	70%
363	Flat River Drainage Canal north of Bossier City, LA	11/14/90–12/12/94	51	148	450	303	300	25	49%
389	Flat River Drainage Canal northeast of Bossier City, LA	11/14/90–12/12/94	50	168	576	298	291	20	40%
390	Flat River Drainage Canal northeast of Shreveport, LA	11/14/90–12/12/94	49	146	432	285	288	24	49%
Subsegment 100708									
1194	Unnamed tributary of Castor Creek near Castor, LA	1/14/02–12/9/02	9	44	126	91	87	7	78%

Table A-4. (continued)

Station number	Station name	Period of record	Number of observations	Minimum (mg/l)	Maximum (mg/l)	Mean (mg/l)	Median (mg/l)	Number of observations above criterion ^a	% of observations above criterion ^a
Subsegment 100710									
1195	Unnamed tributary of Grand Bayou near Hall Summit, LA	1/15/02–12/10/02	9	144	205	173	169	9	100%
Subsegment 100804									
1206	Unnamed tributary of Saline Bayou near Arcadia, LA	1/14/02–12/9/02	12	64	468	237	228	4	33%
Subsegment 101101									
1217	Cane River west of Colfax, LA	1/28/02–4/20/04	16	85	384	191	156	15	94%
Subsegment 101103									
42	Kisatchie Bayou near Lotus, LA	3/6/78–4/14/98	227	32	386	103	100	108	48%
549	Kisatchie Bayou at Kisatchie, LA	10/14/96–11/18/96	2	34	54	44	44	0	0%
550	Little Sandy Creek at Kisatchie, LA	10/14/96–11/18/96	2	26	67.9	46.95	46.95	0	0%
1218	Kisatchie Bayou south of Cypress, LA	1/28/02–4/20/04	16	80	163	99	92	6	38%

Table A-4. (continued)

Station number	Station name	Period of record	Number of observations	Minimum (mg/l)	Maximum (mg/l)	Mean (mg/l)	Median (mg/l)	Number of observations above criterion ^a	% of observations above criterion ^a
Subsegment 101303									
1222	Iatt Creek southeast of Iatt, LA	1/28/02–12/16/02	16	80	163	112	92	6	67%

^a The water quality criteria for TDS in the Red River Basin are as follows:

Subsegment 100406: 300 mg/L

Subsegment 100708: 79 mg/L

Subsegment 100710: 79 mg/L

Subsegment 100804: 250 mg/L

Subsegment 101101: 100 mg/L

Subsegment 101103: 100 mg/L

Subsegment 101303: 100 mg/L

Table A-5. Summary of turbidity data for the Red River Basin

Station number	Station name	Period of record	Number of observations	Minimum (NTU)	Maximum (NTU)	Mean (NTU)	Median (NTU)	Number of observations above criterion ^a	% of observations above criterion ^a
Subsegment 101401									
1223	Buhlow Lake northwest of Pineville, LA	1/28/02–12/16/02	12	19	69	37	36	9	75%

^a Turbidity criterion for Subsegment 101401: 25 NTU.

Appendix B

Water Quality Data by Sampling Location

(CD-ROM)

This appendix contains large files, which are included only on a CD-ROM. To obtain a copy of this appendix, please contact EPA.

Appendix C

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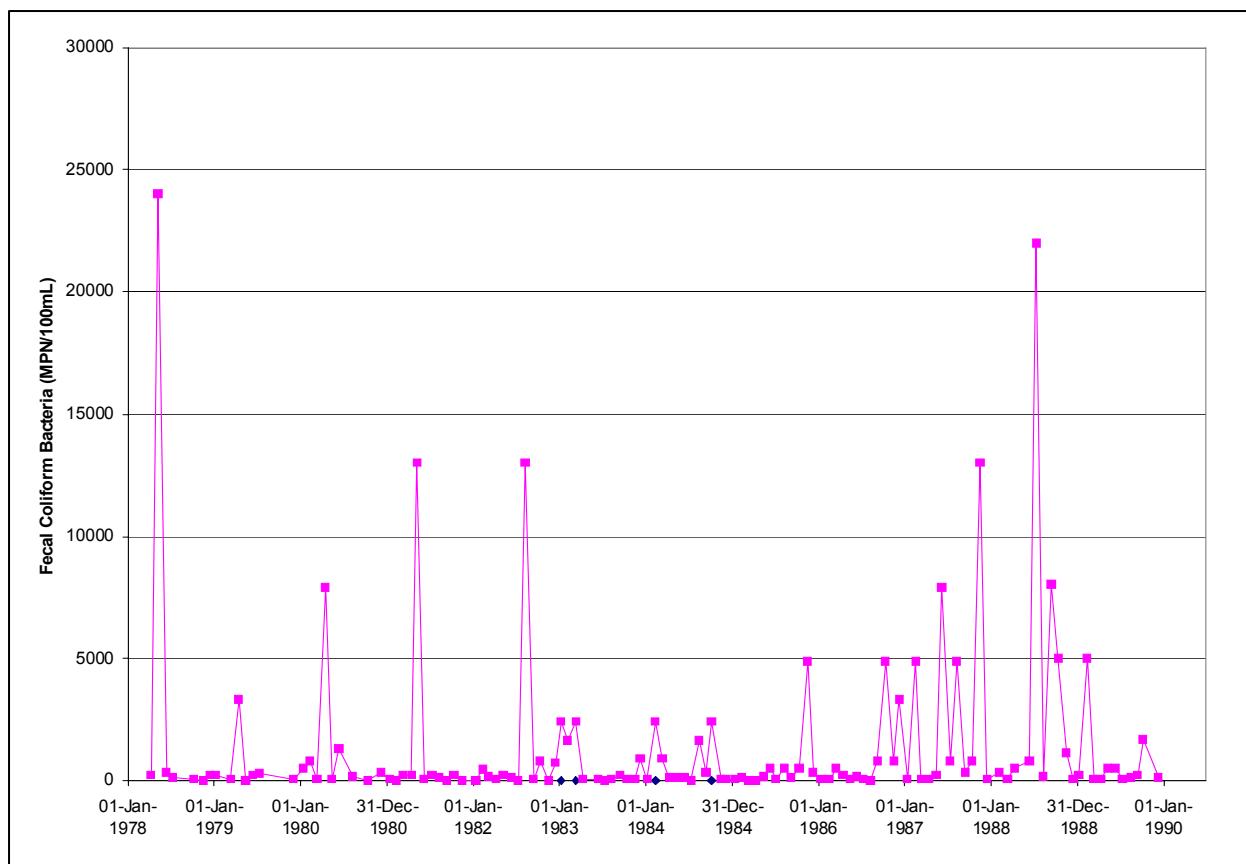


Figure C-1. Fecal coliform bacteria observations at Kelly Bayou (subsegment 100306) near Hosston, Louisiana (station 56).

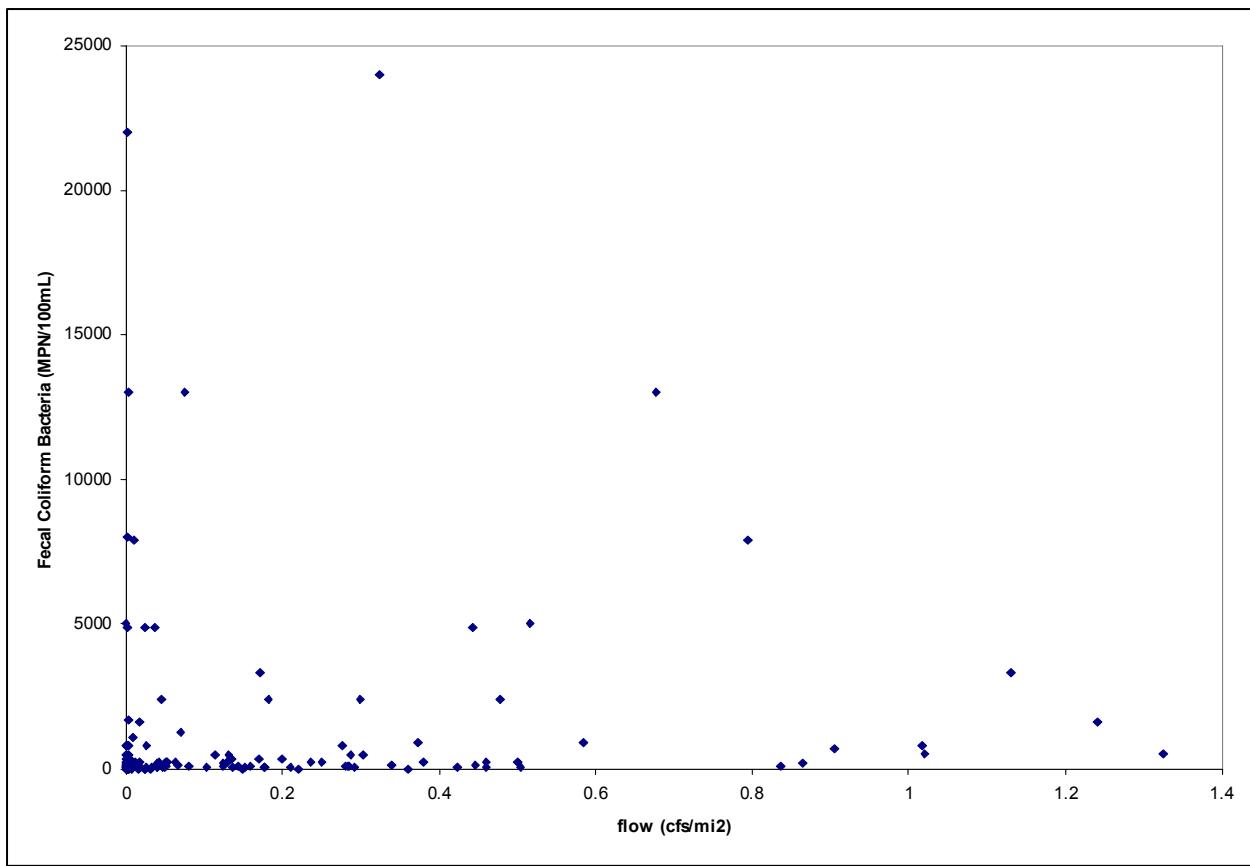


Figure C-2. Fecal coliform bacteria versus flow at Kelly Bayou (subsegment 100306) near Hosston, Louisiana (station 56).

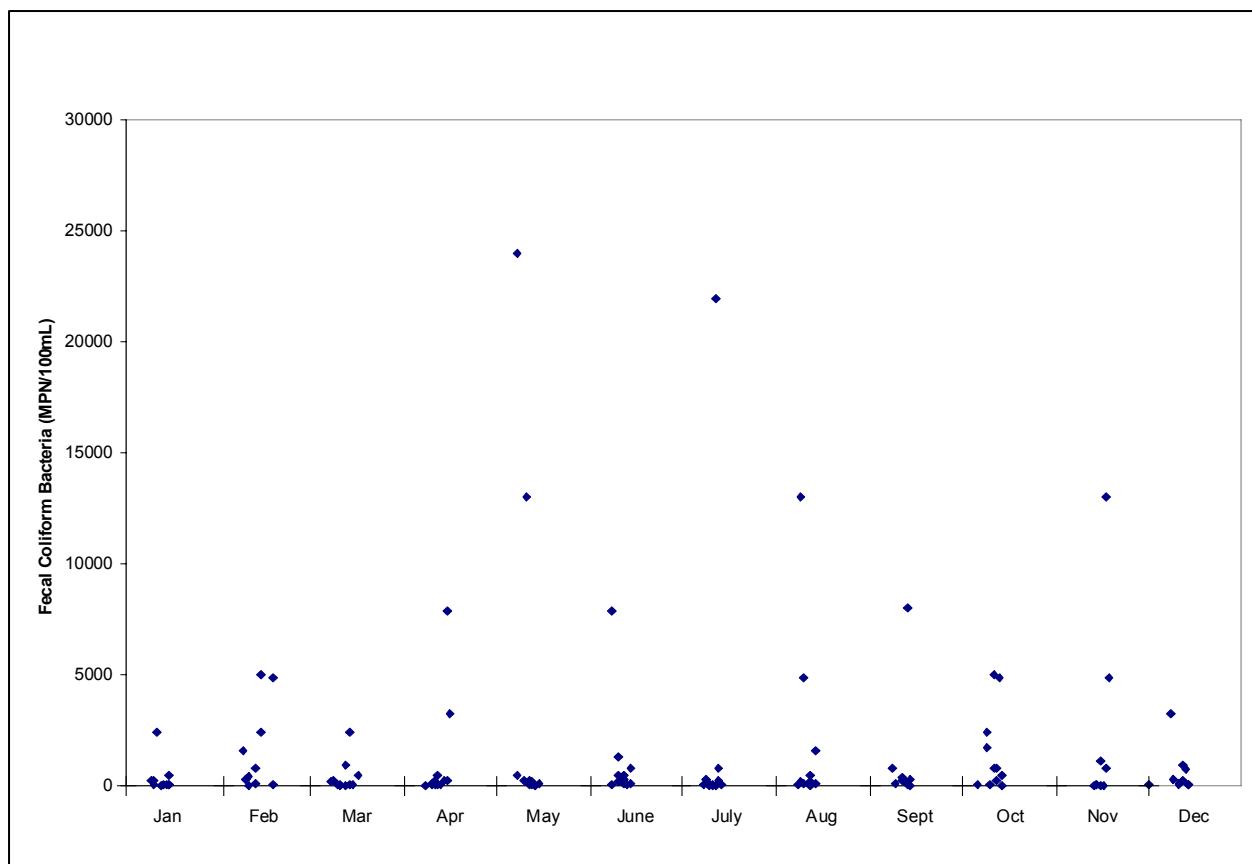


Figure C-3. Fecal coliform bacteria observations by season at Kelly Bayou (subsegment 100306) near Hosston, Louisiana (station 56).

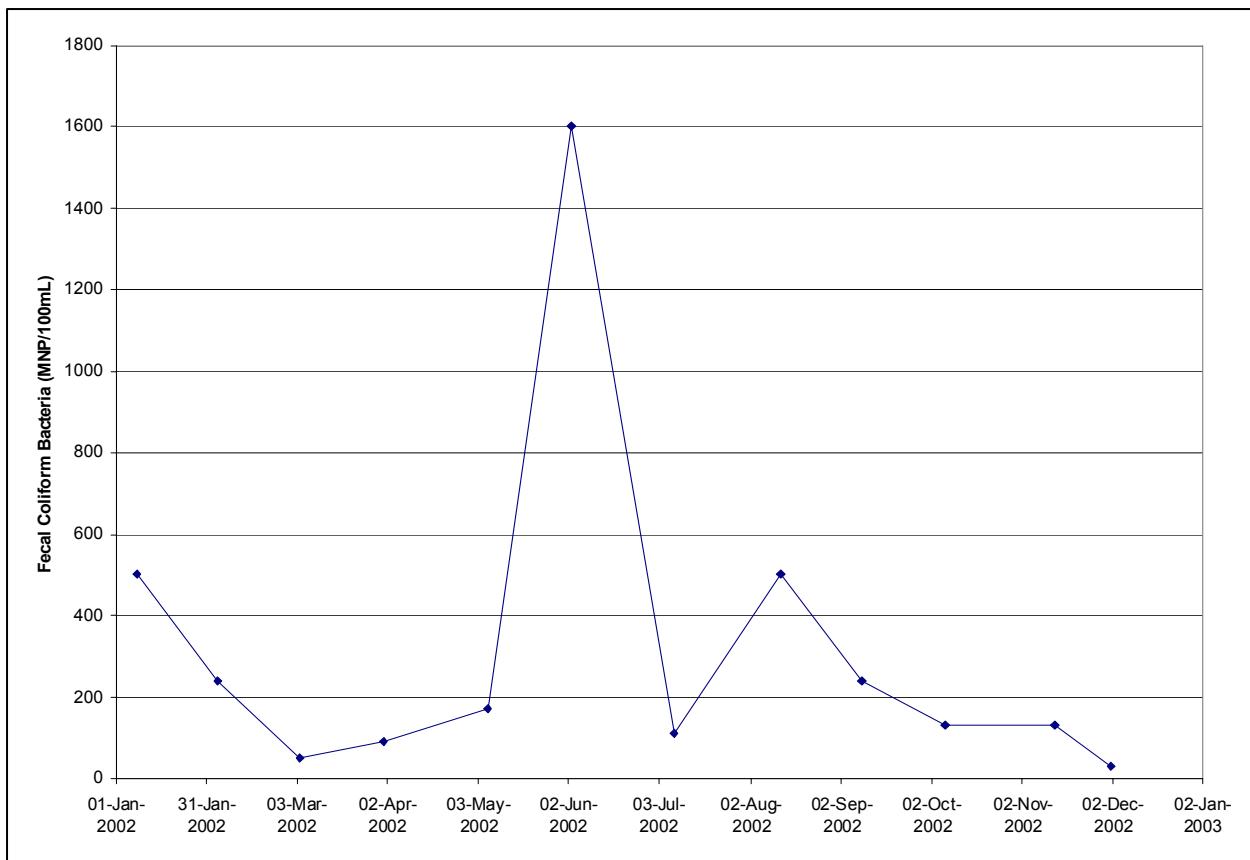


Figure C-4. Fecal coliform bacteria observations at Kelly Bayou (subsegment 100306) at Huckaby Road near Hosston, Louisiana (station 1192).

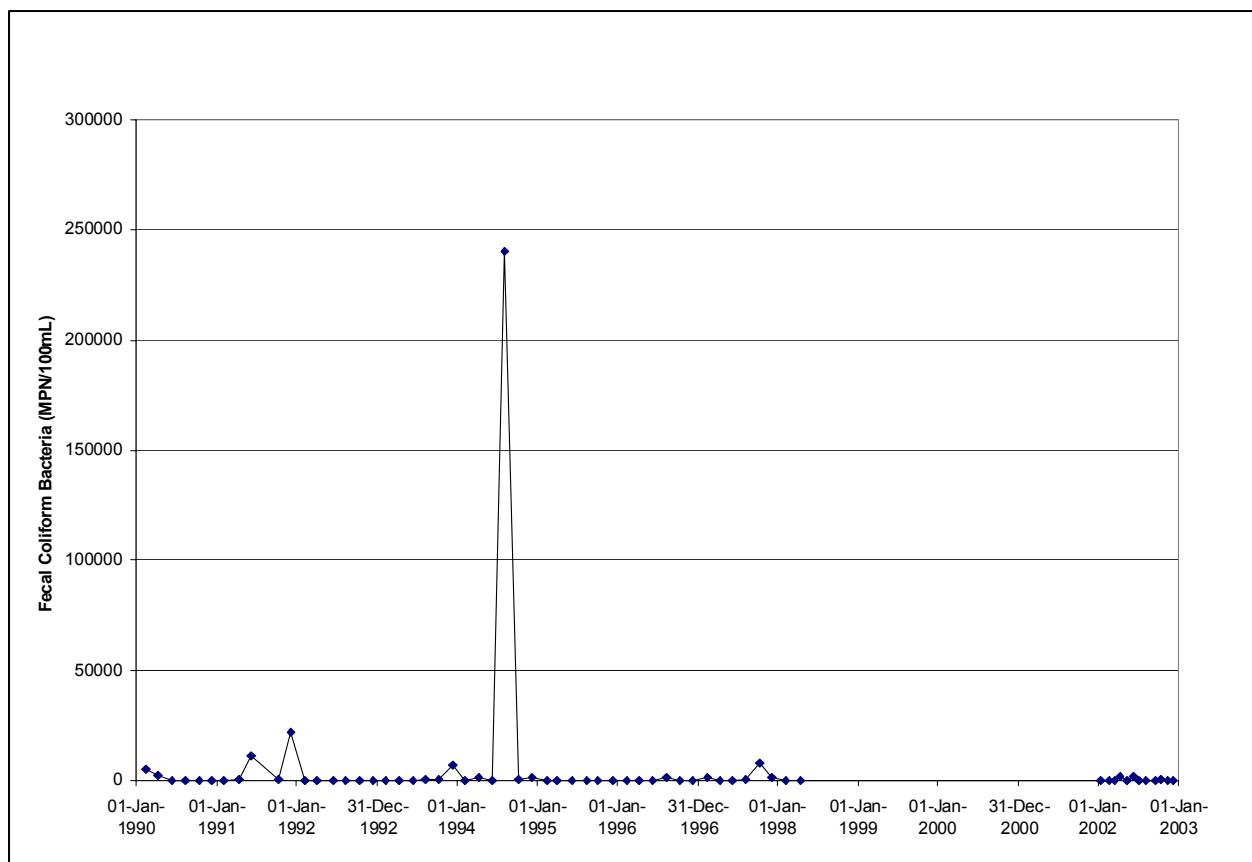


Figure C-5. Fecal coliform bacteria observations at Flat River (subsegment 100406) east of Taylortown, Louisiana (station 272).

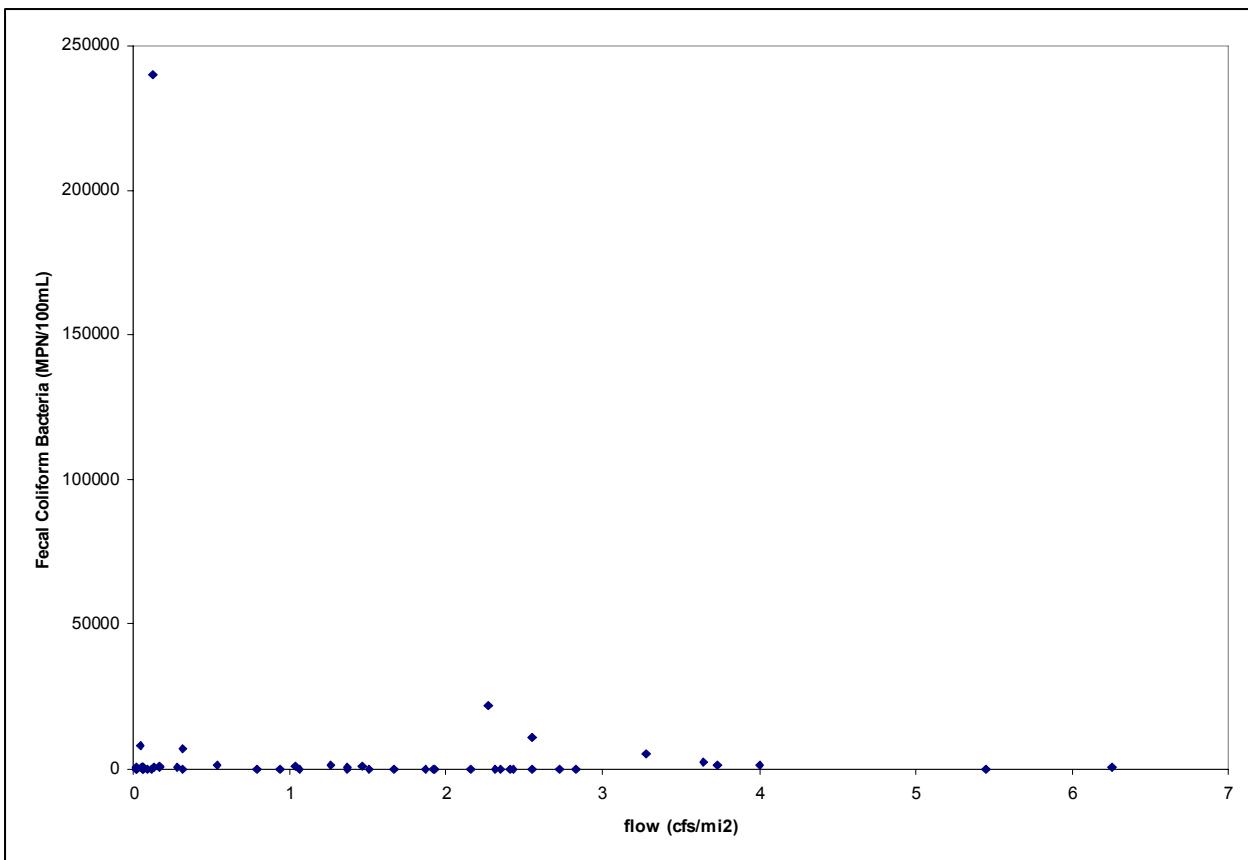


Figure C-6. Fecal coliform bacteria versus flow at Flat River (subsegment 100406) east of Taylortown, Louisiana (station 272).

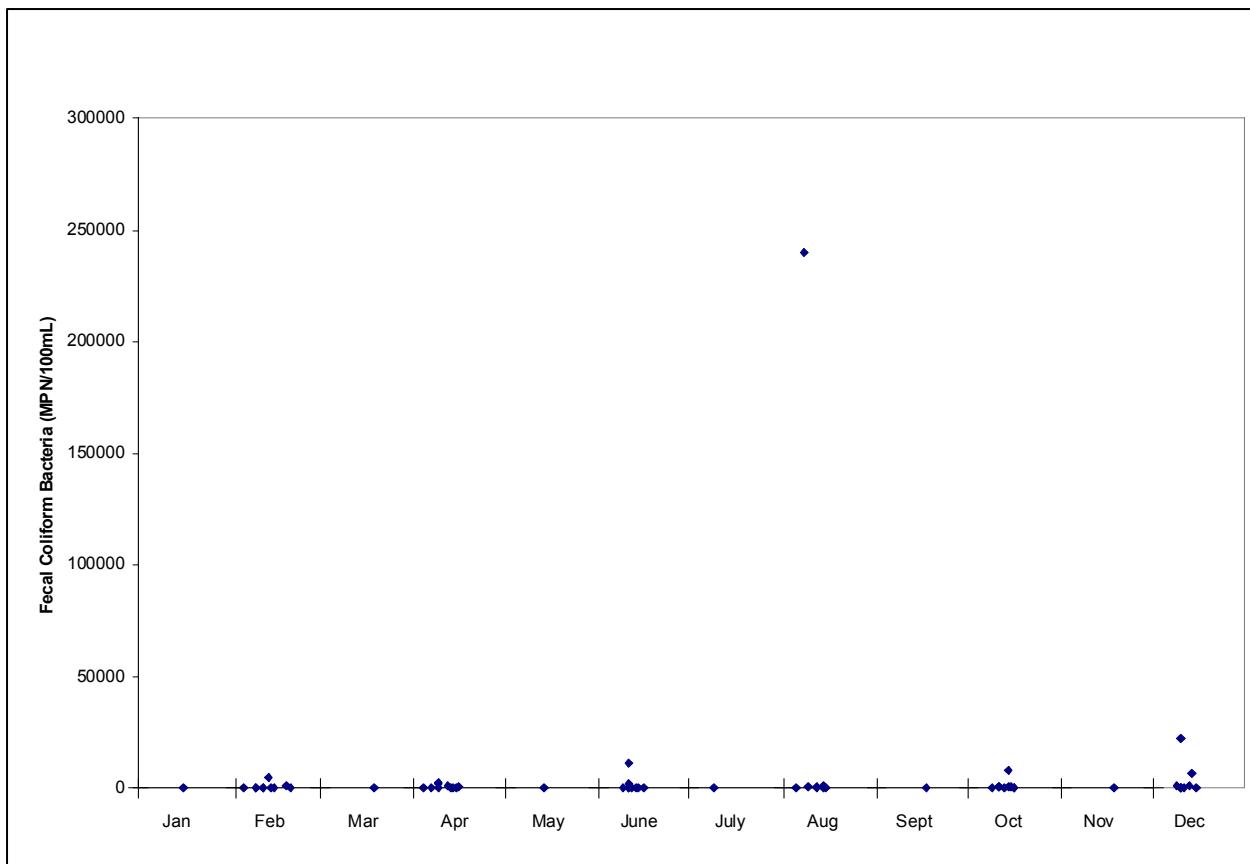


Figure C-7. Fecal coliform bacteria observations by season at Flat River (subsegment 100406) east of Taylortown, Louisiana (station 272).

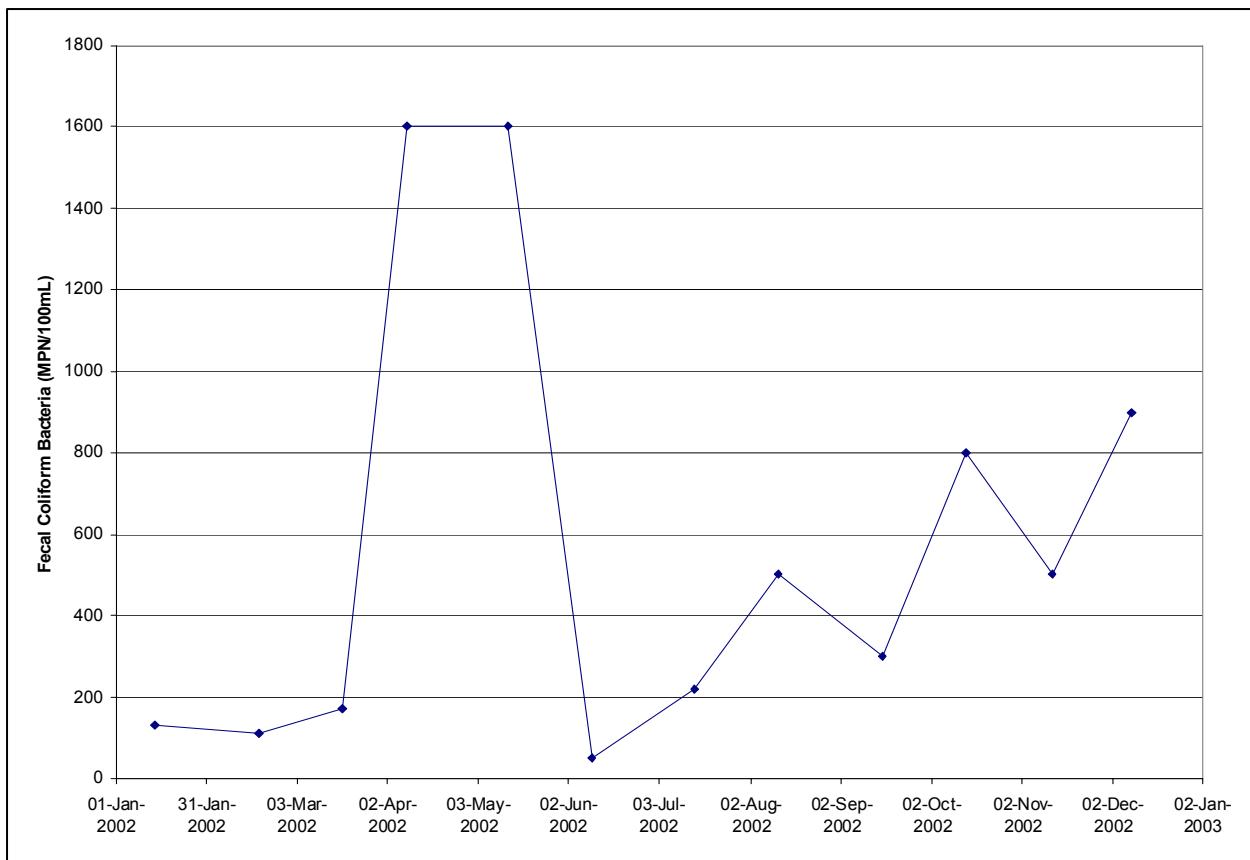


Figure C-8. Fecal coliform bacteria observations at Castor Creek (subsegment 100707) at Highway 507, southwest of Castor, Louisiana (station 1189).

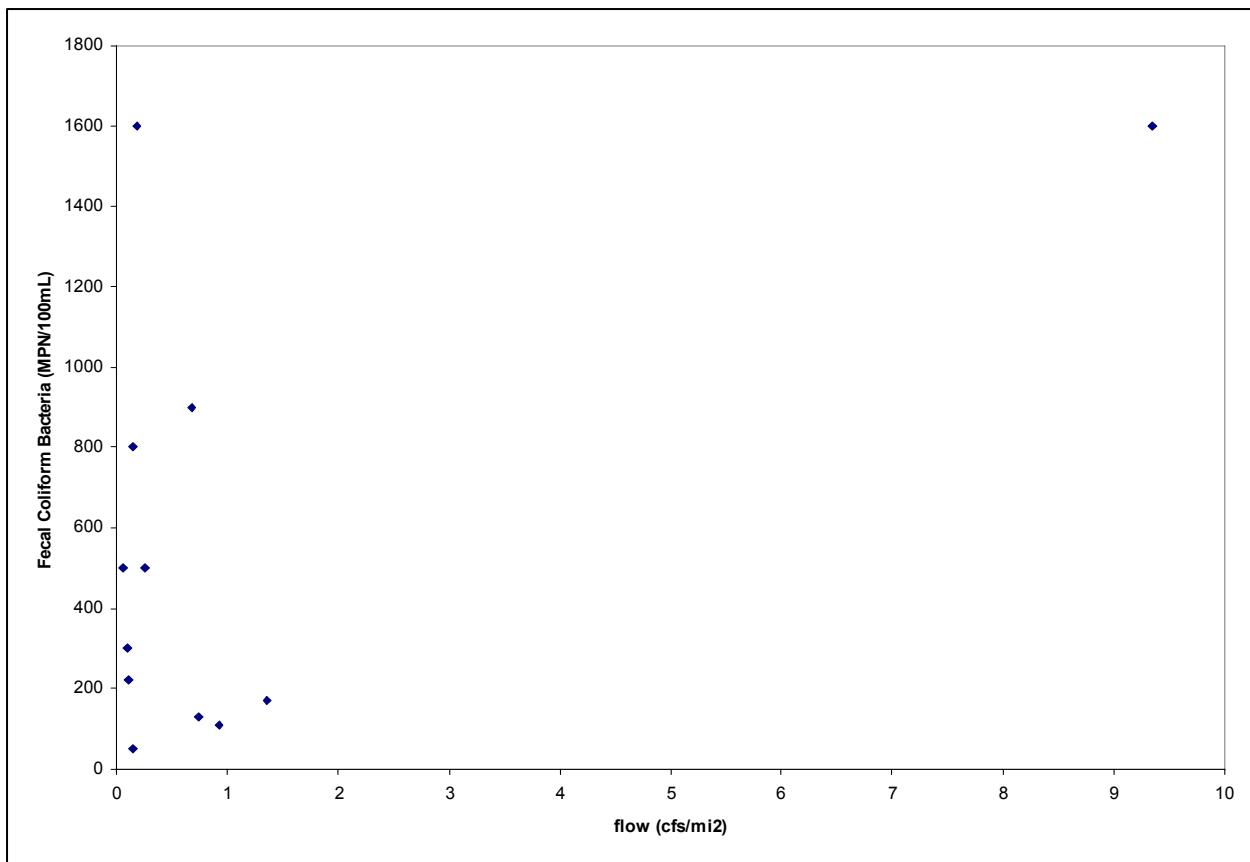


Figure C-9. Fecal coliform bacteria versus flow at Castor Creek (subsegment 100707) at Highway 507, southwest of Castor, Louisiana (station 1189).

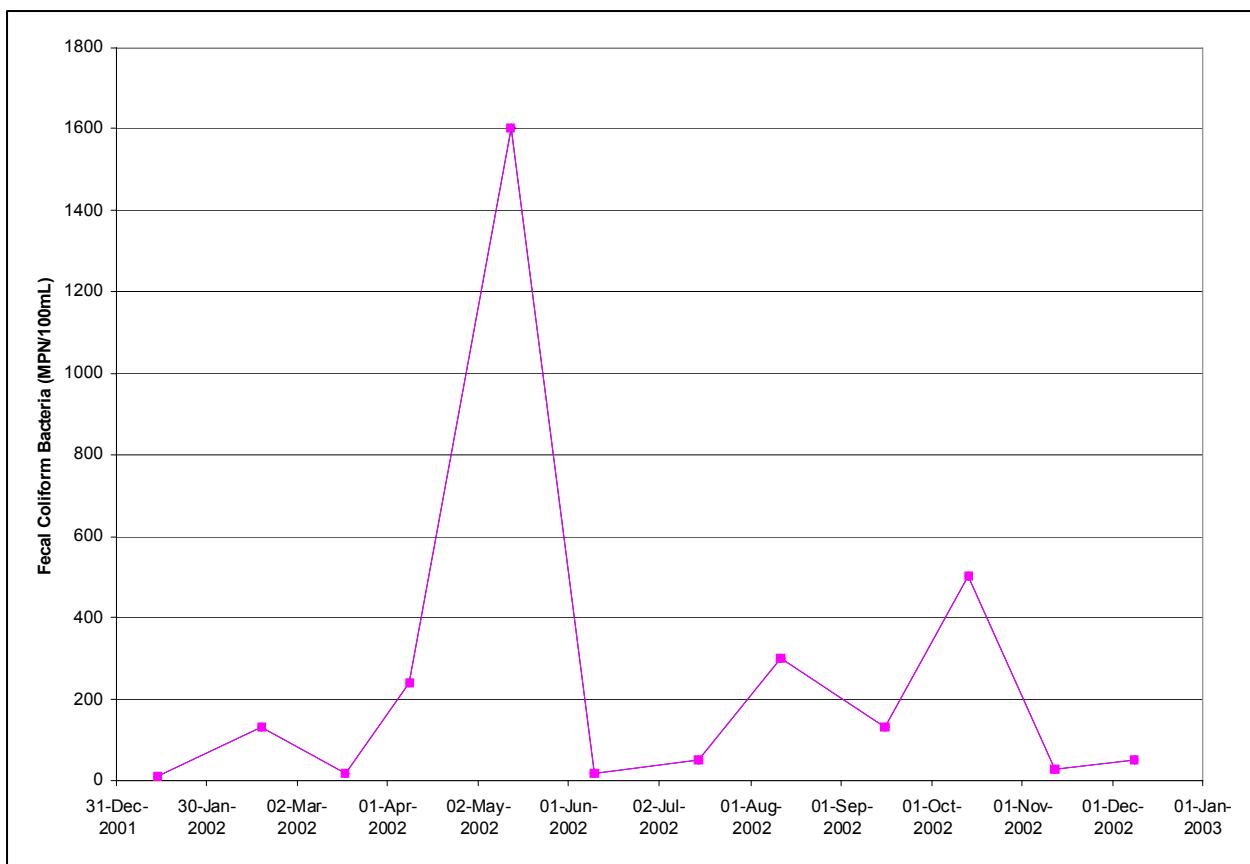


Figure C-10. Fecal coliform bacteria observations at Grand Bayou (subsegment 100709) at Highway 507, north of Fairview Alpha, Louisiana (station 1190).

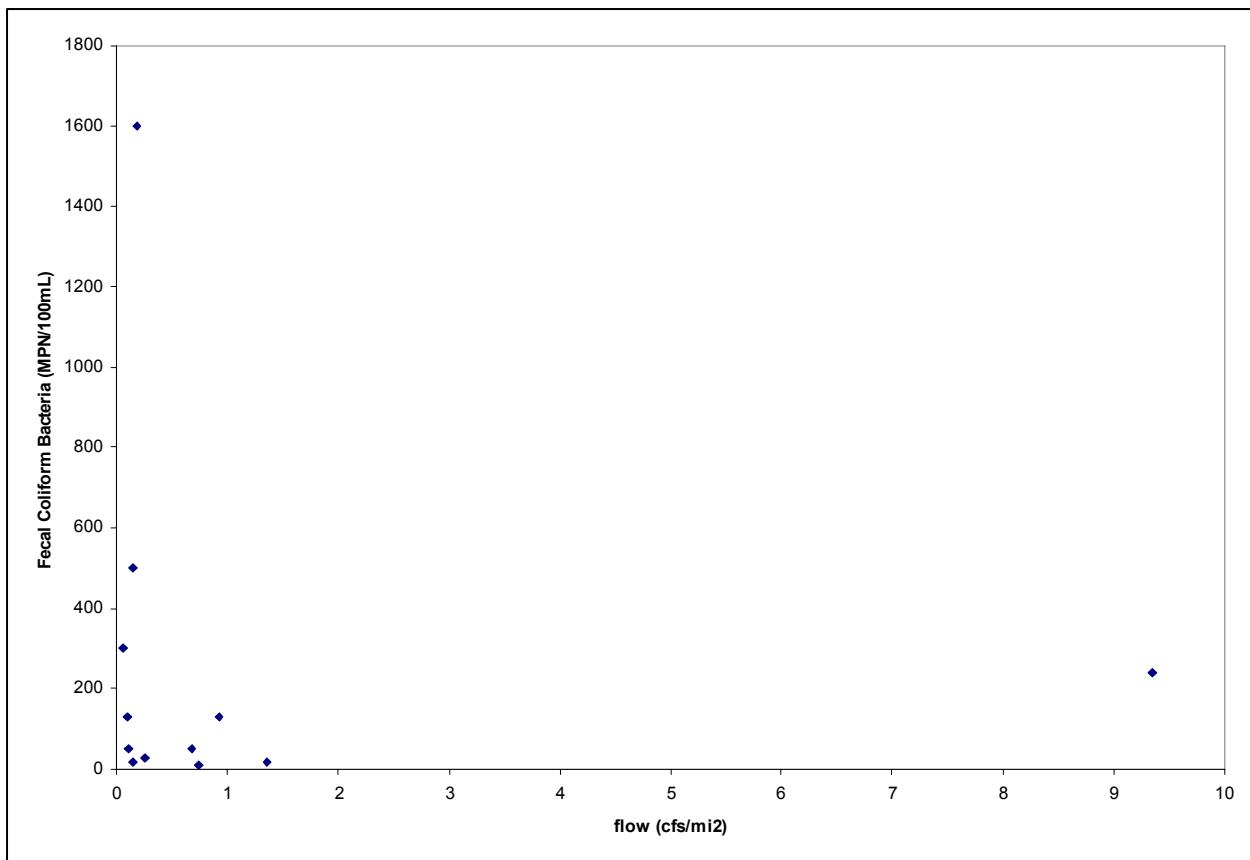


Figure C-11. Fecal coliform bacteria versus flow at Grand Bayou (subsegment 100709) at Highway 507, north of Fairview Alpha, Louisiana (station 1190).

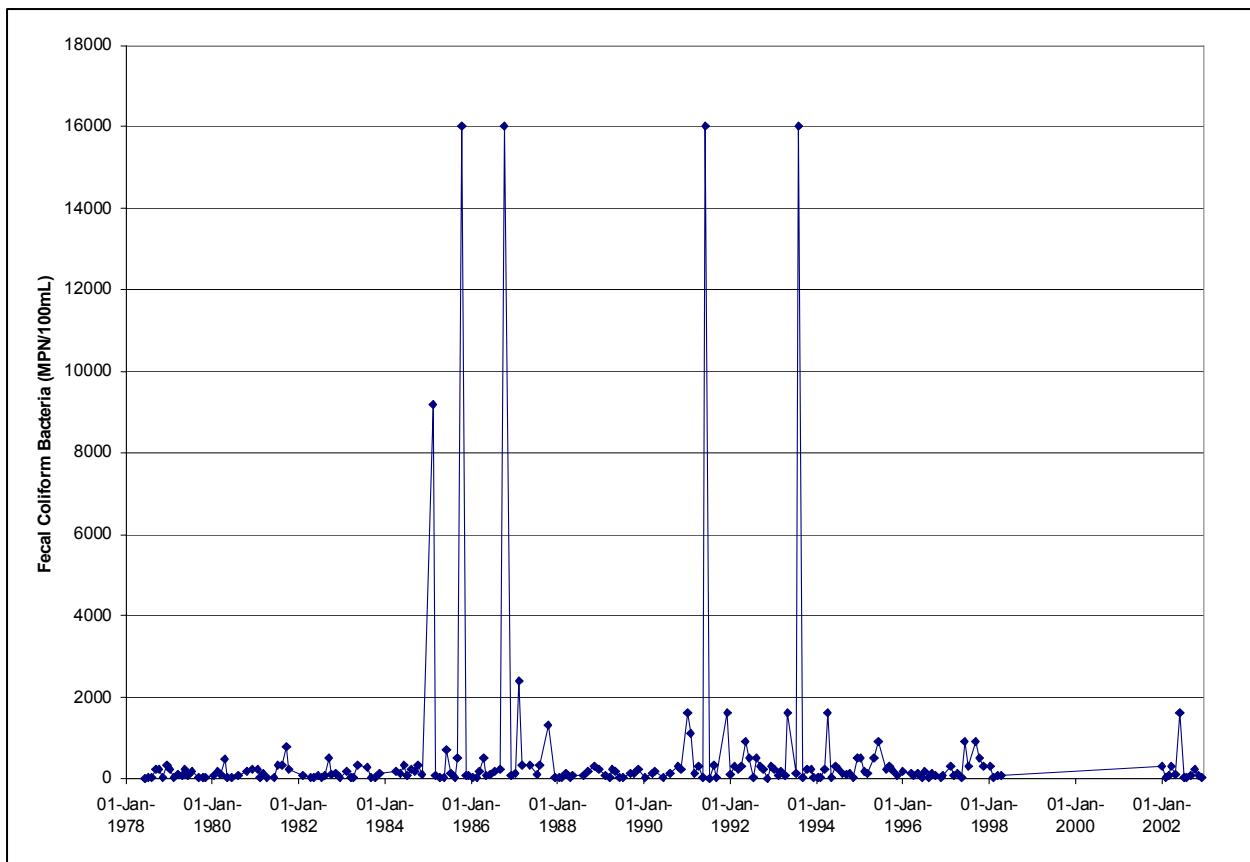


Figure C-12. Fecal coliform bacteria observations at Saline Bayou (subsegment 100801) near Goldonna, Louisiana (station 75).

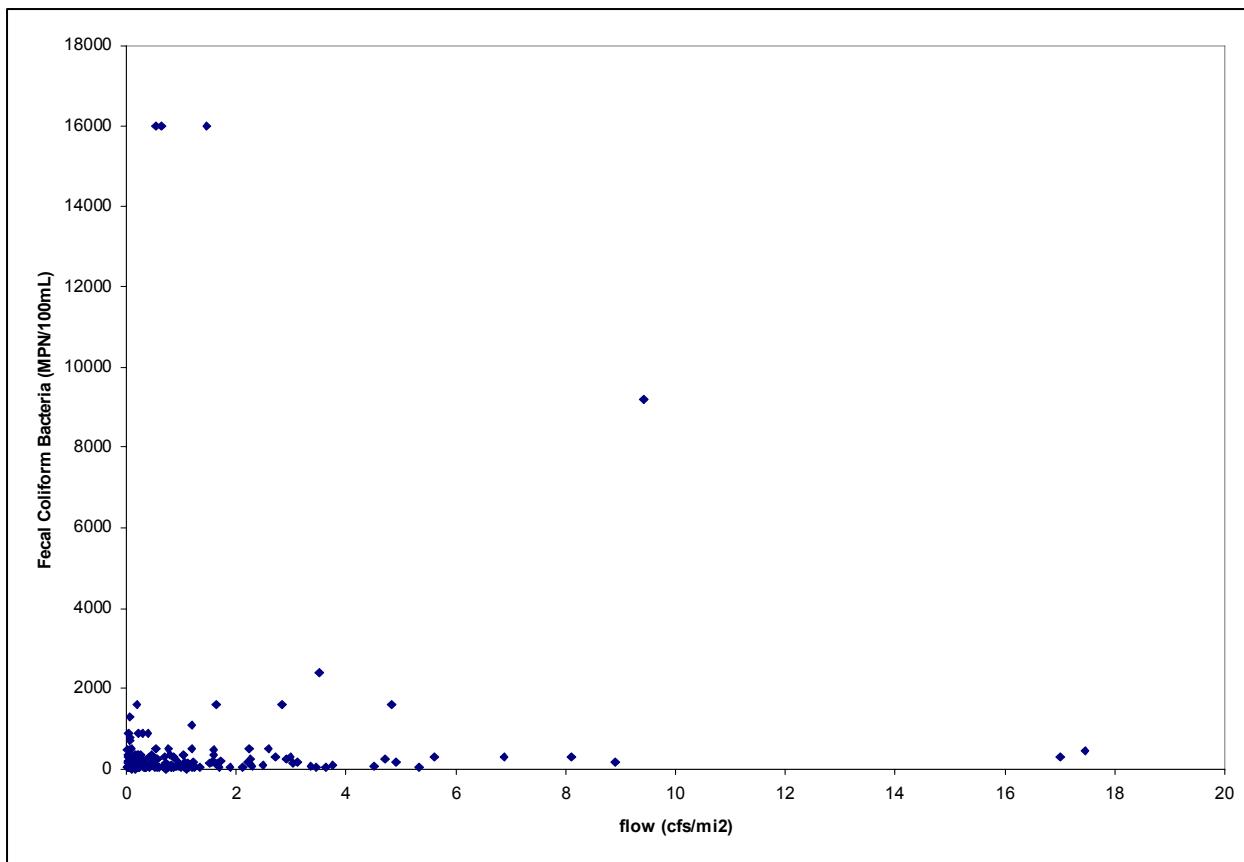


Figure C-13. Fecal coliform bacteria versus flow at Saline Bayou (subsegment 100801) near Goldonna, Louisiana (station 75).

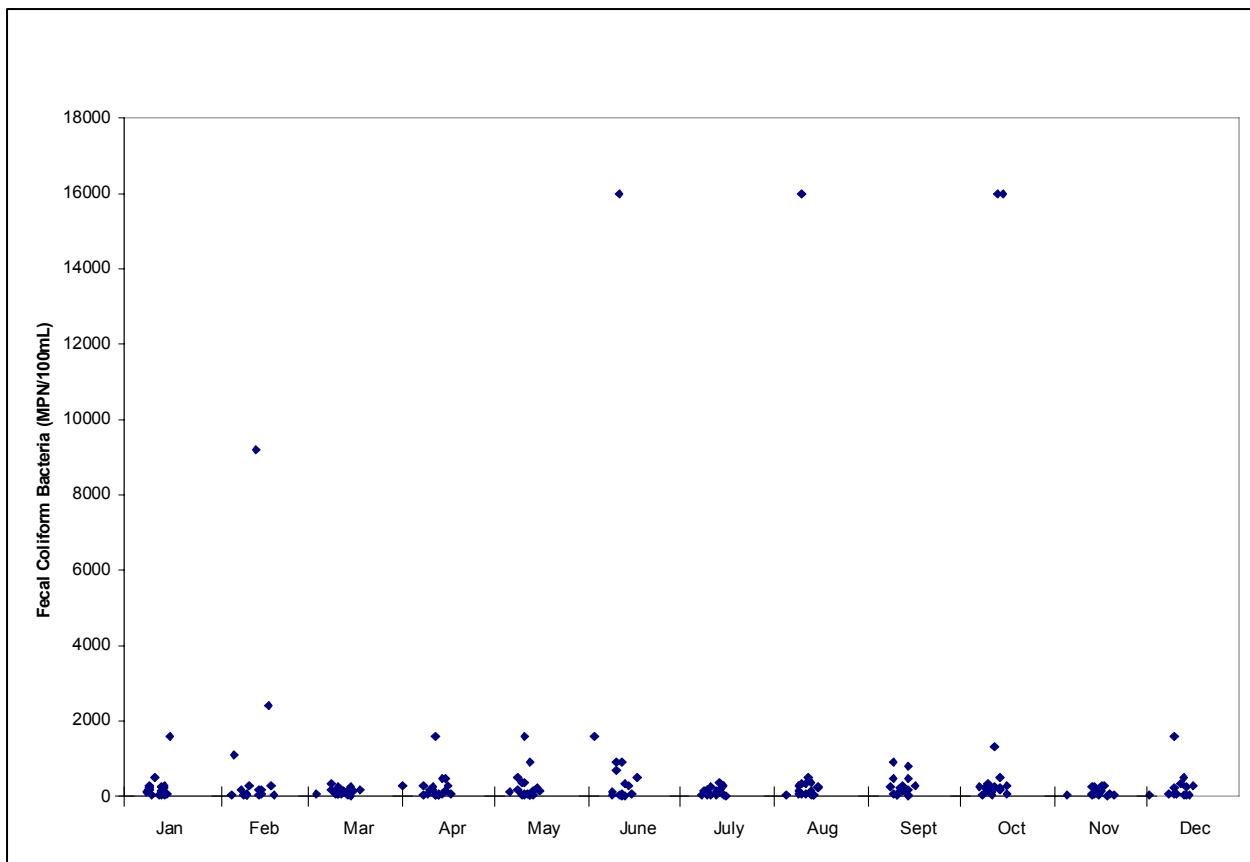


Figure C-14. Fecal coliform bacteria observations by season at Saline Bayou (subsegment 100801) near Goldonna, Louisiana (station 75).

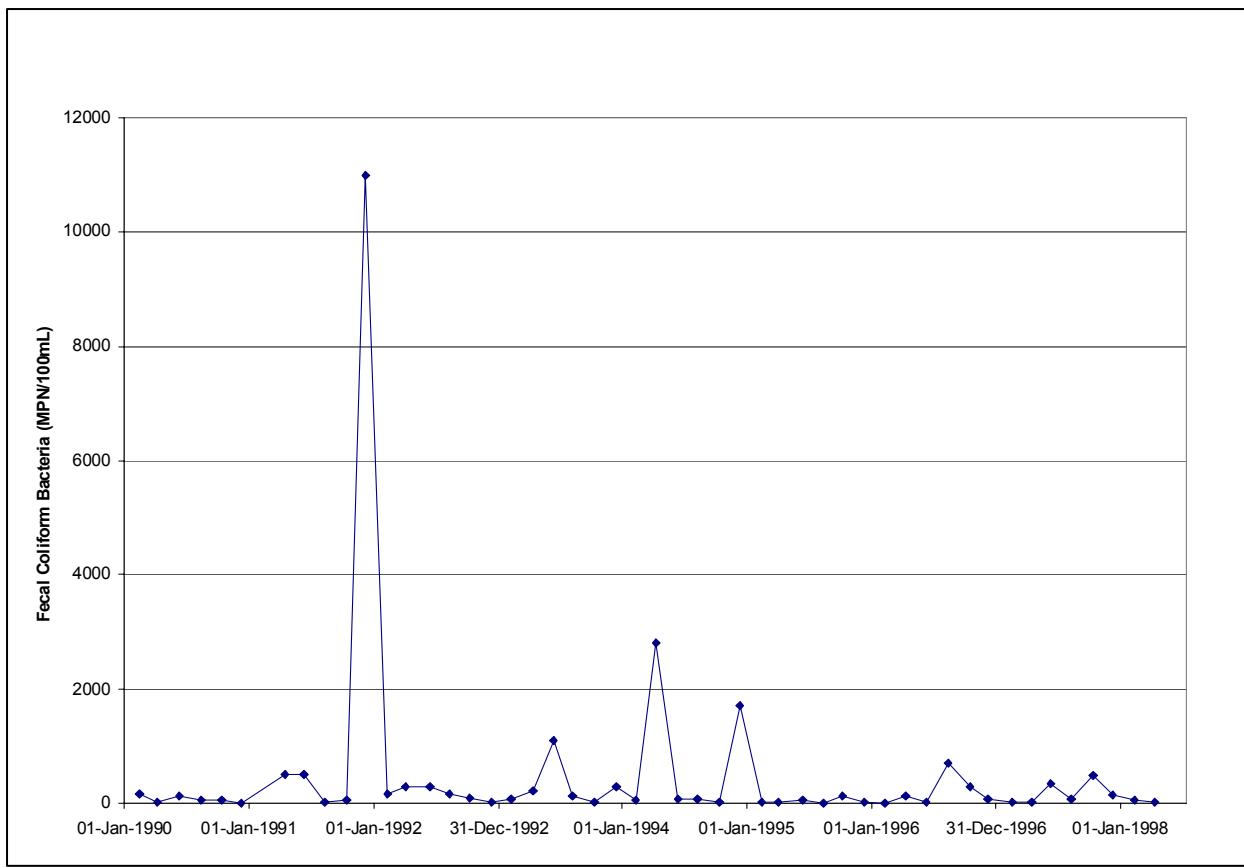


Figure C-15. Fecal coliform bacteria observations at Saline Bayou (subsegment 100801) east of Bienville, Louisiana (station 284).

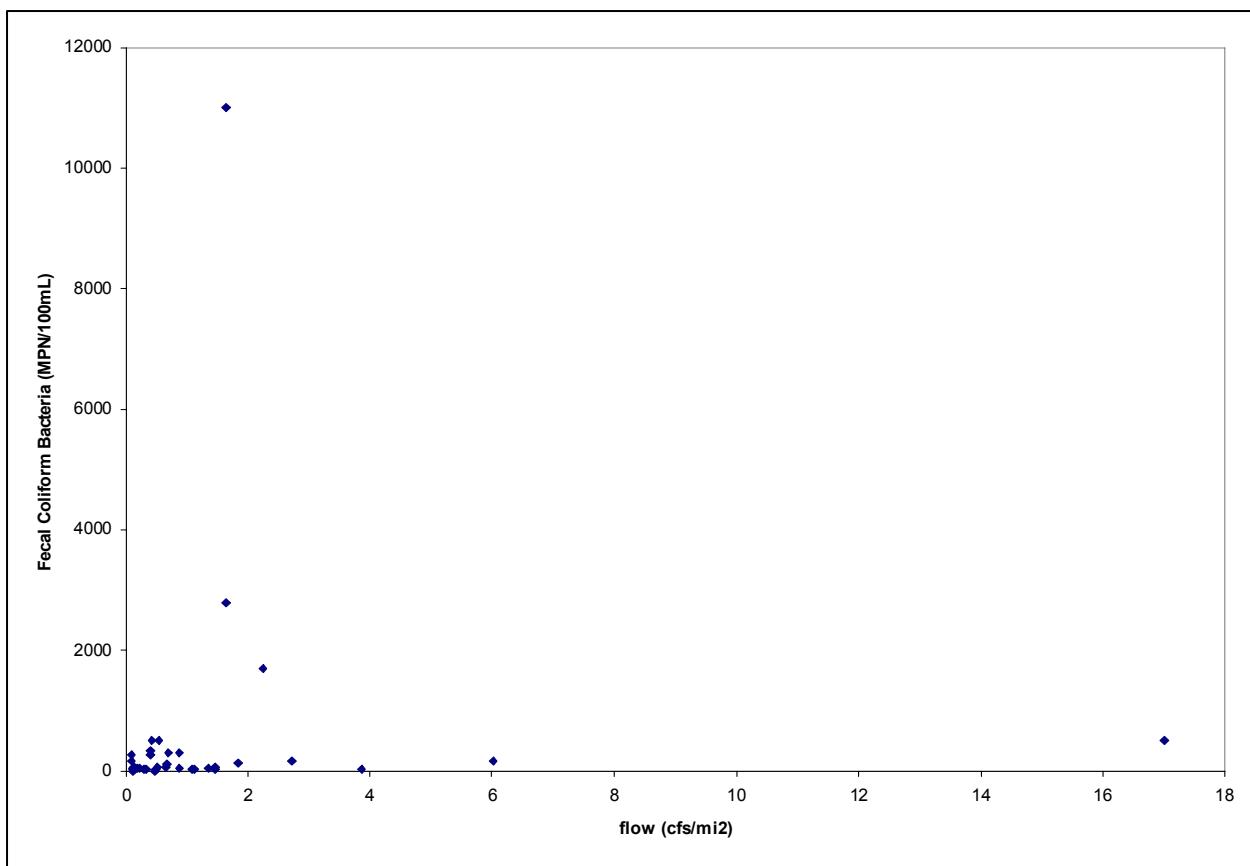


Figure C-16. Fecal coliform bacteria versus flow at Saline Bayou (subsegment 100801) east of Bienville, Louisiana (station 284).

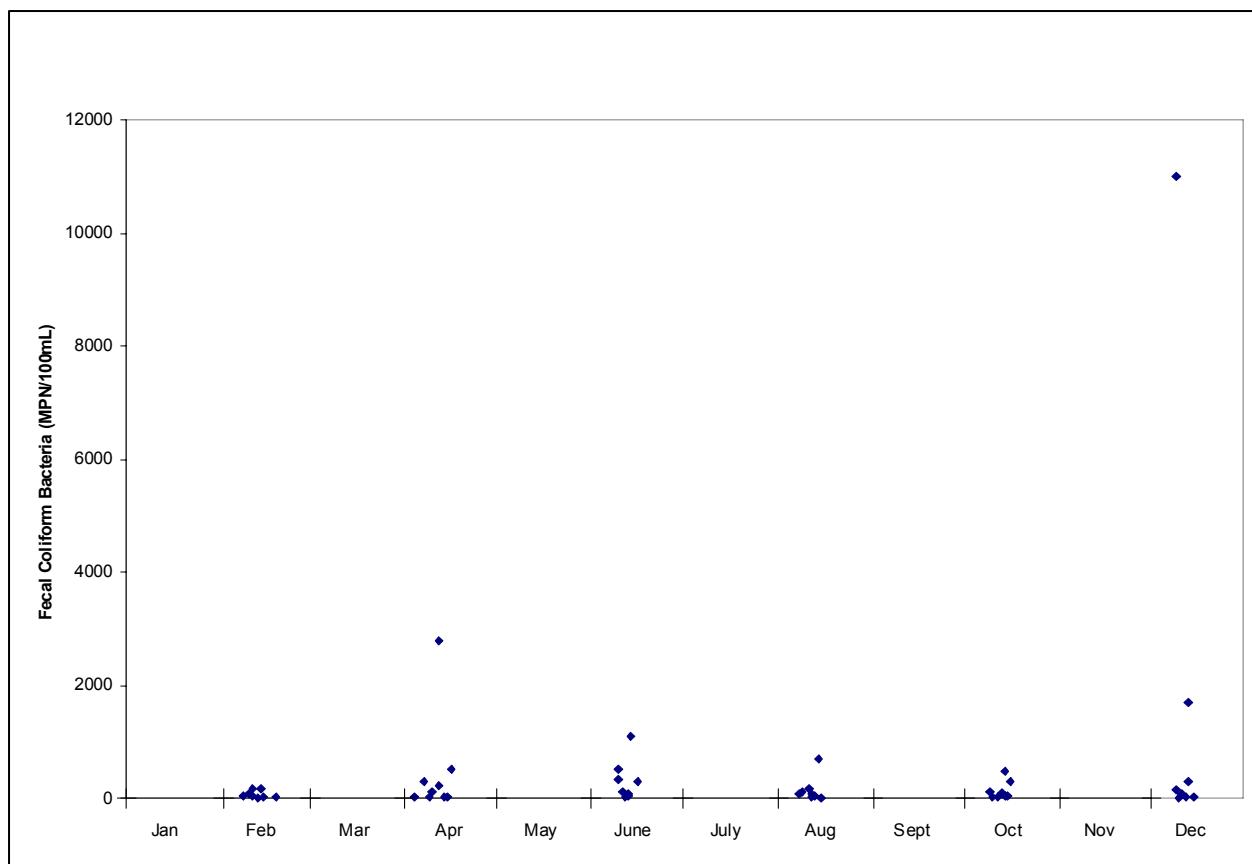


Figure C-17. Fecal coliform bacteria observations by season at Saline Bayou (subsegment 100801) east of Bienville, Louisiana (station 284).

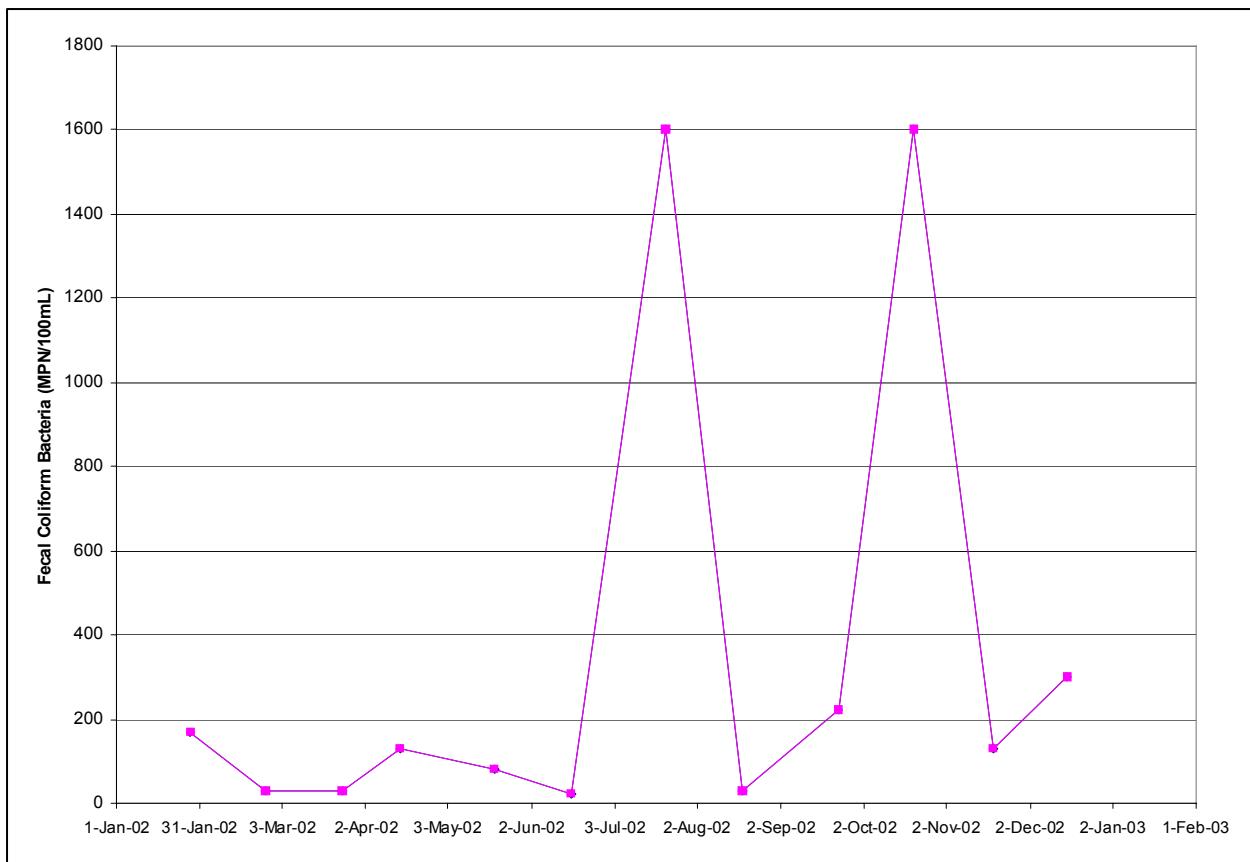


Figure C-18. Fecal coliform bacteria observations at Nantachie Creek (subsegment 100901) east of Montgomery, Louisiana (station 1215).

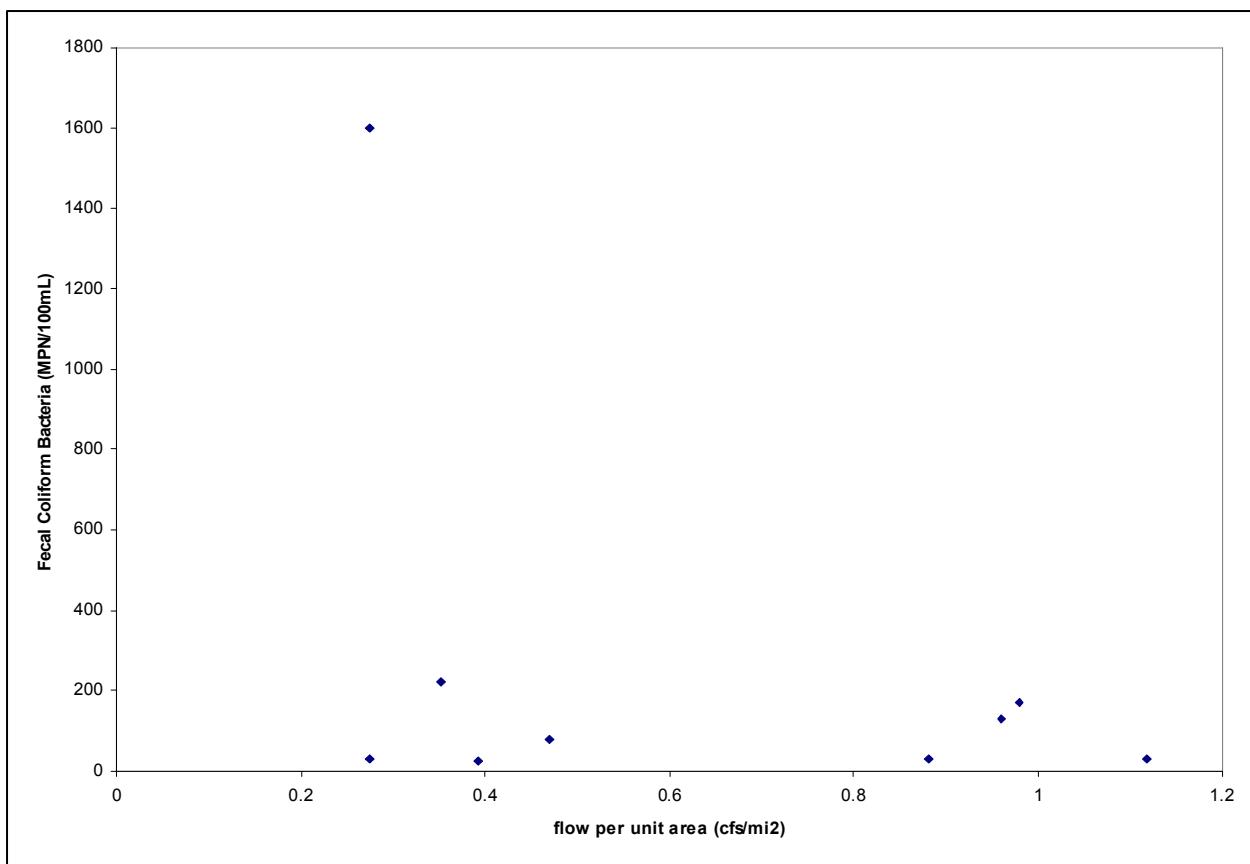


Figure C-19. Fecal coliform bacteria versus flow at Nantachie Creek (subsegment 100901) east of Montgomery, Louisiana (station 1215).

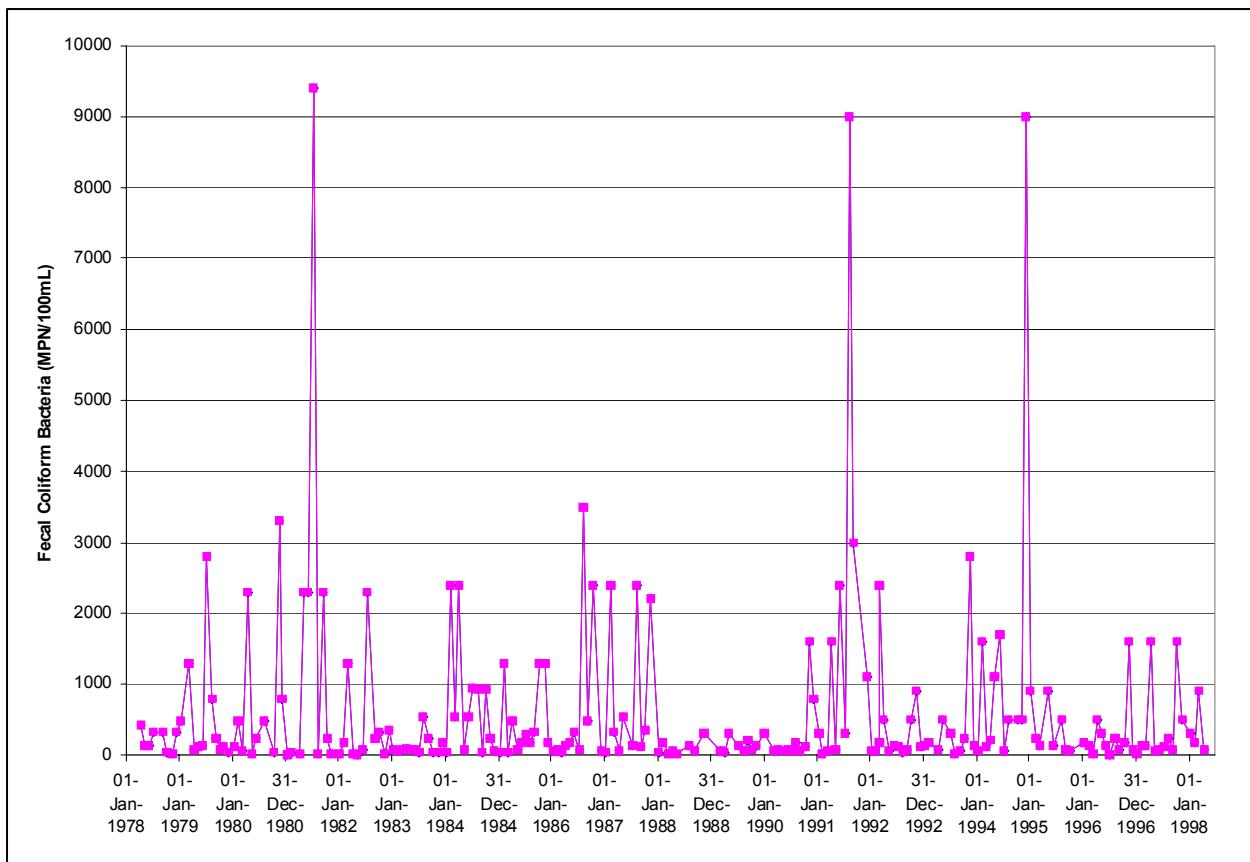


Figure C-20. Fecal coliform bacteria observations at Kisatchie Bayou (subsegment 101103) near Lotus, Louisiana (station 42).

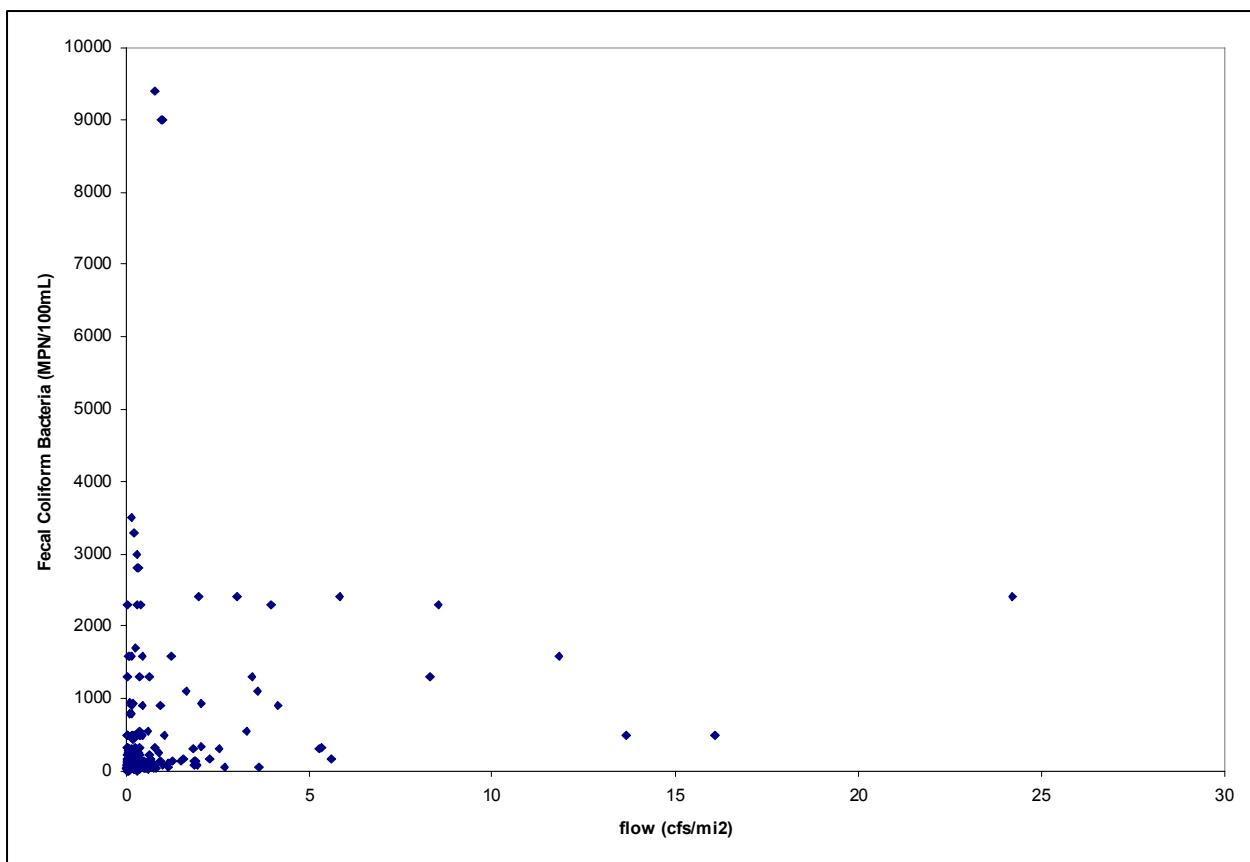


Figure C-21. Fecal coliform bacteria versus flow at Kisatchie Bayou (subsegment 101103) near Lotus, Louisiana (station 42).

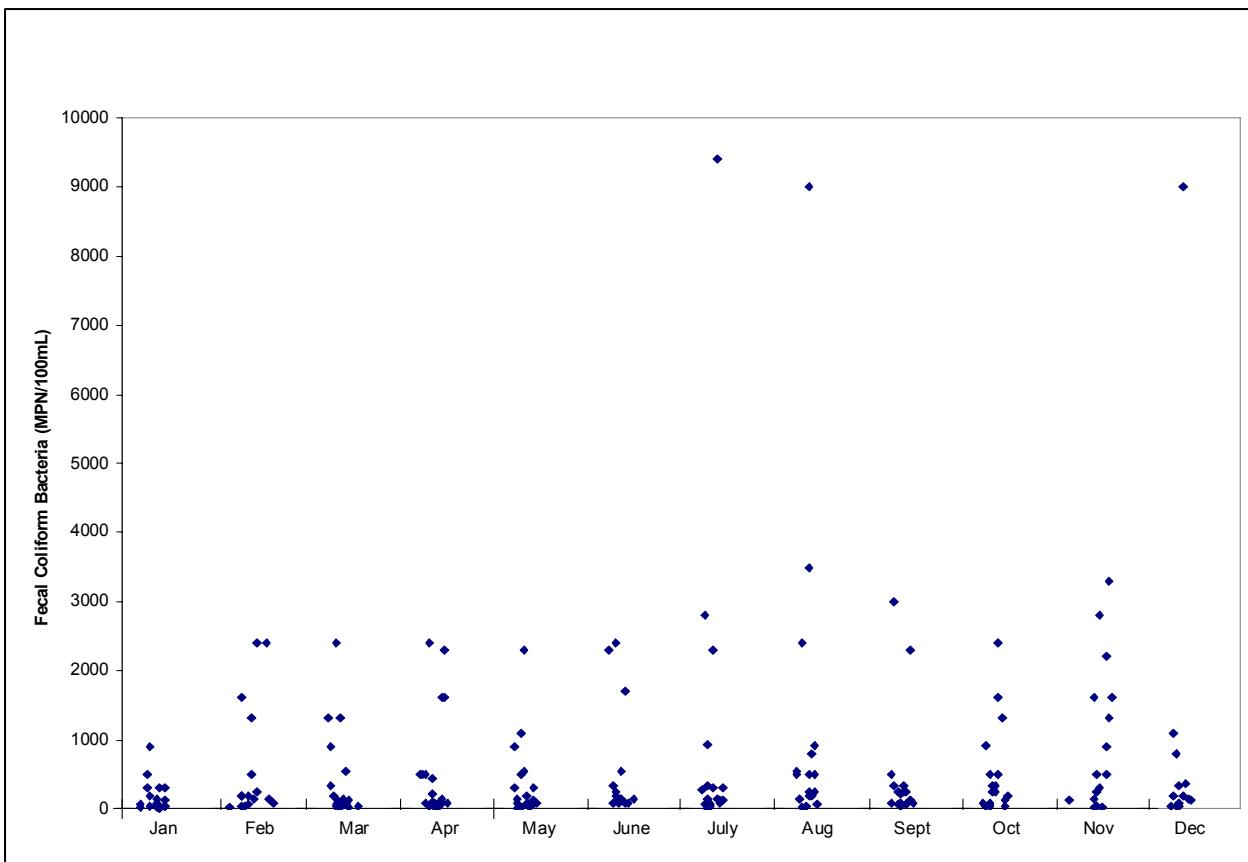


Figure C-22. Fecal coliform bacteria observations by season at Kisatchie Bayou (subsegment 101103) near Lotus, Louisiana (station 42).

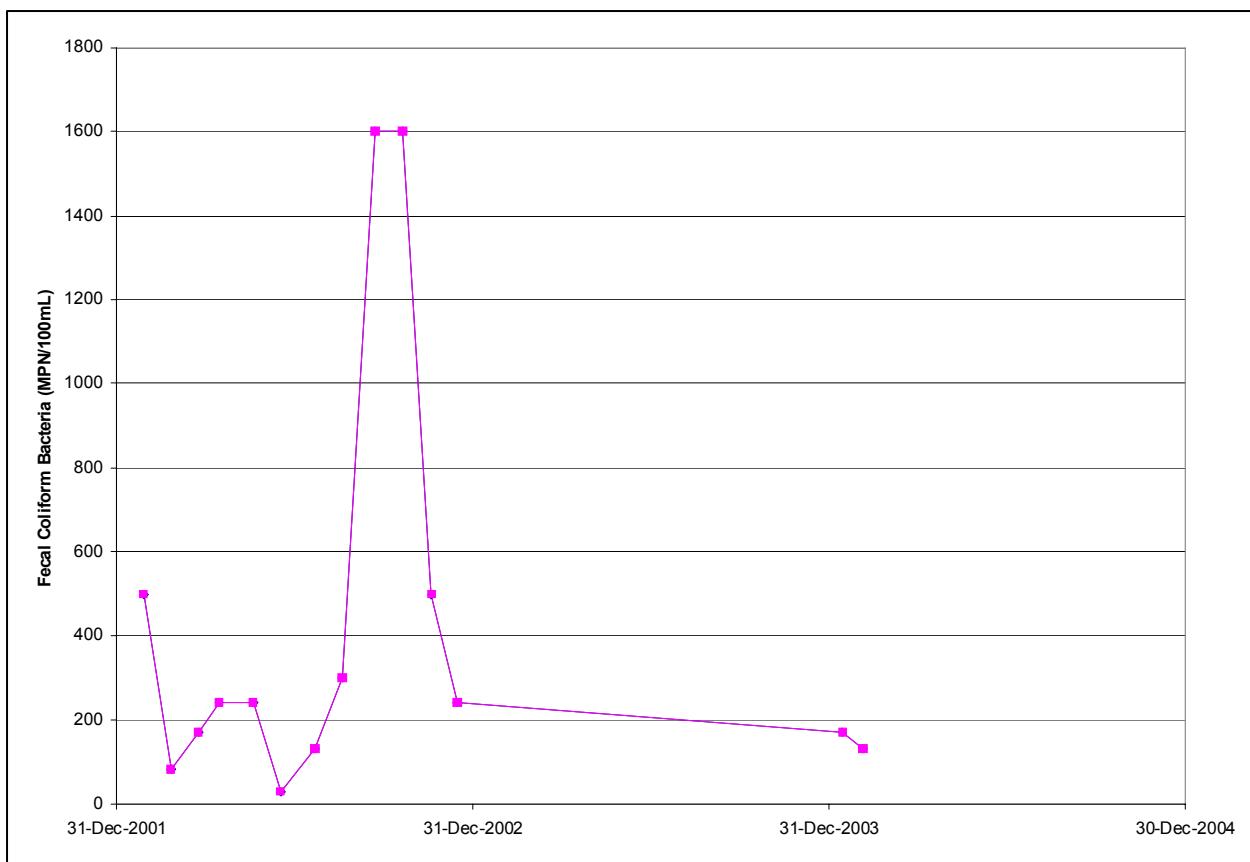


Figure C-23. Fecal coliform bacteria observations at Kisatchie Bayou (subsegment 101103) south of Cypress, Louisiana (station 1218).

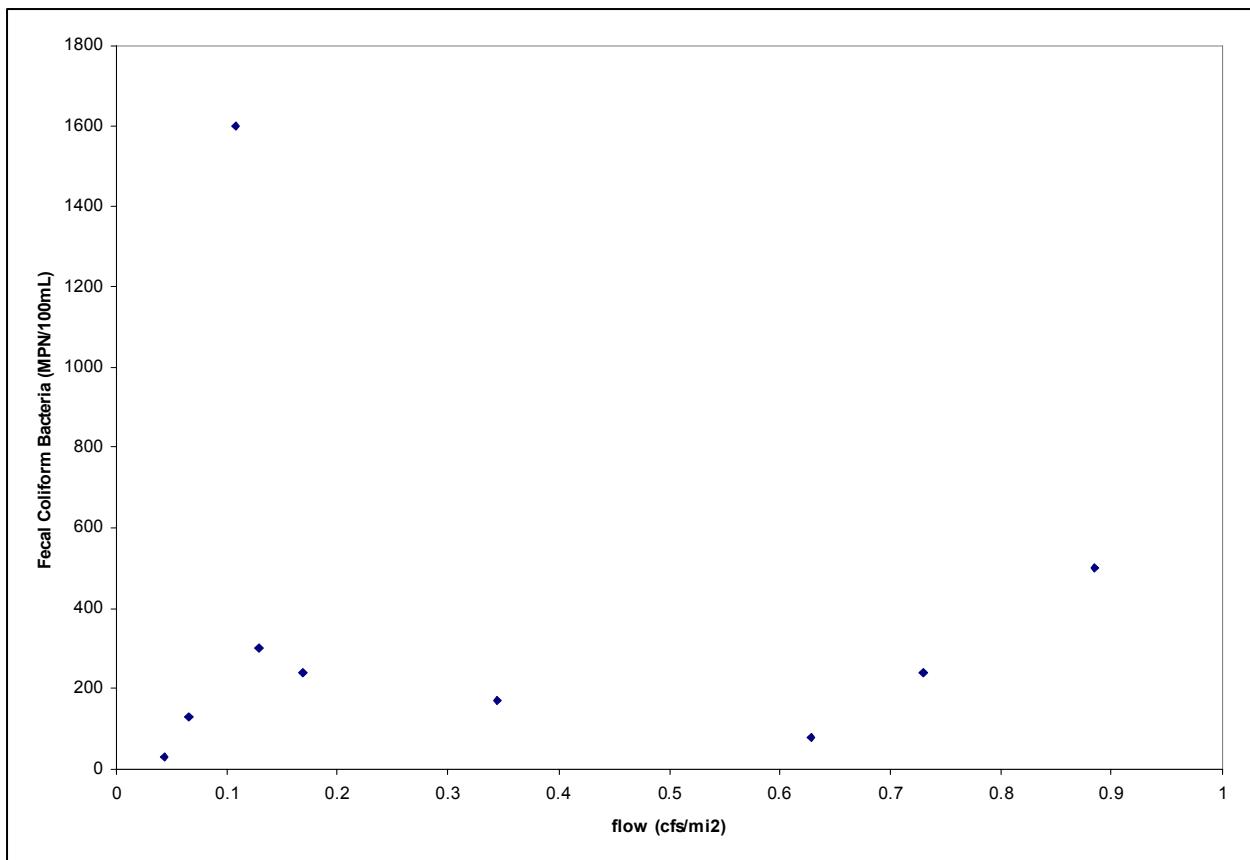


Figure C-24. Fecal coliform bacteria versus flow at Kisatchie Bayou (subsegment 101103) south of Cypress, Louisiana (station 1218).

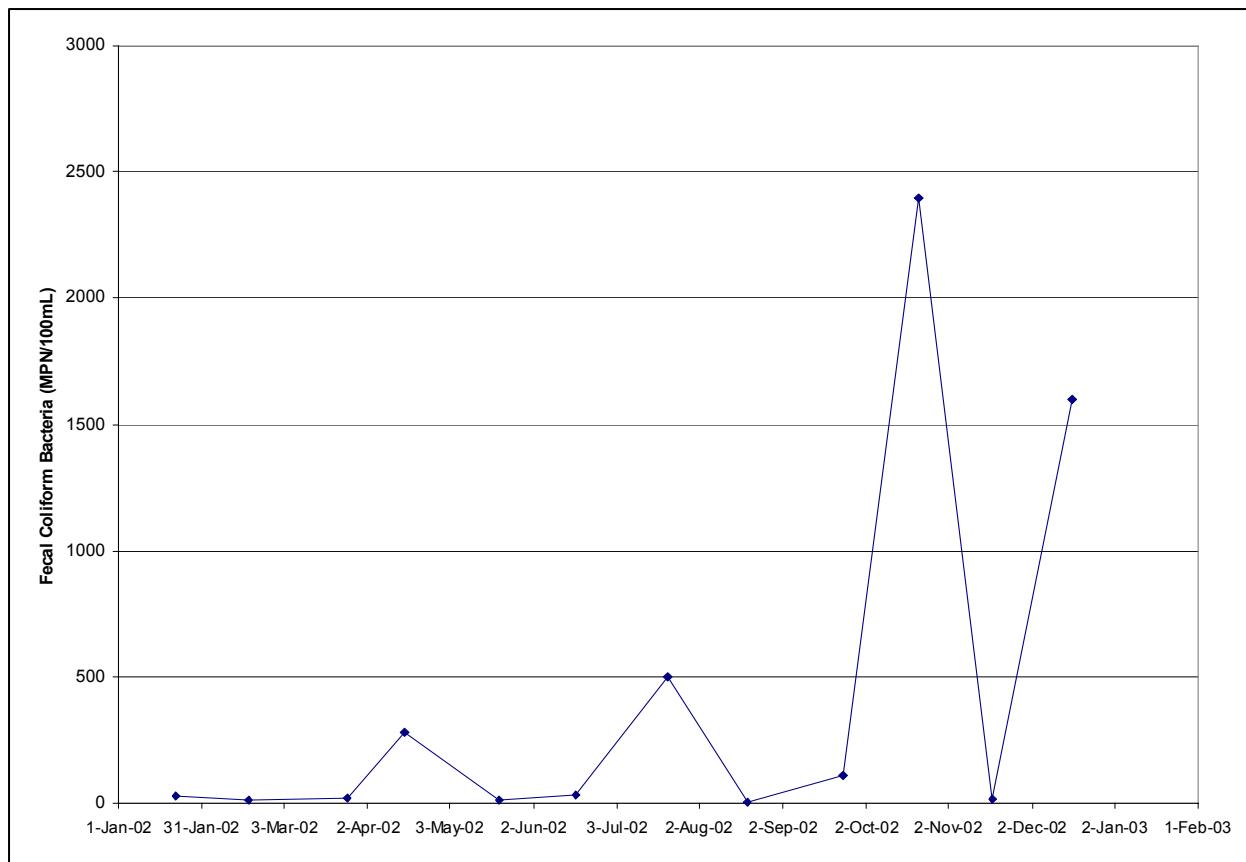


Figure C-25. Fecal coliform bacteria observations at Rigolette Bayou (subsegment 101301) northwest of Pineville, Louisiana (station 1220).

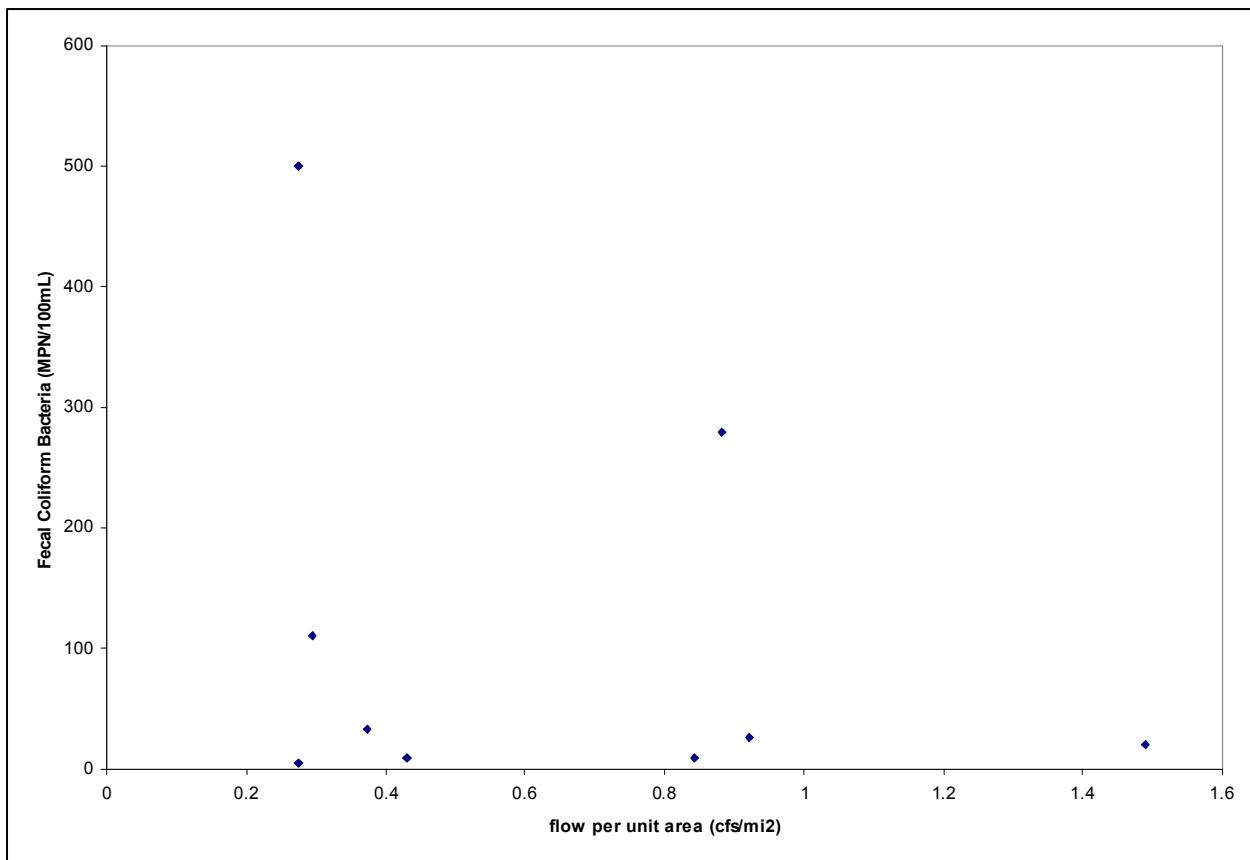


Figure C-26. Fecal coliform bacteria versus flow at Rigolette Bayou (subsegment 101301) northwest of Pineville, Louisiana (station 1220).

Appendix D

Chloride Figures for Red River Basin

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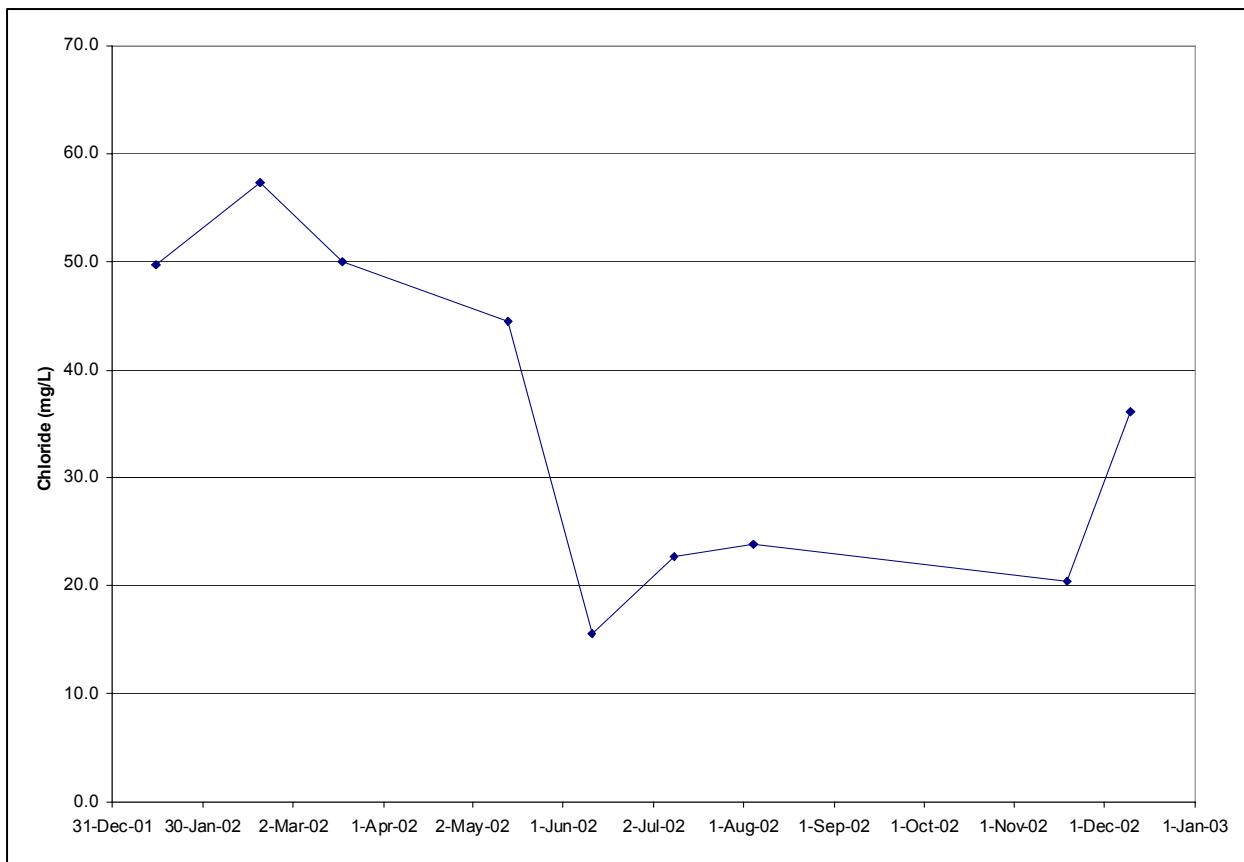


Figure D-1. Chloride observations at unnamed tributary of Grand Bayou (subsegment 100710) near Hall Summit, Louisiana (station 1195).

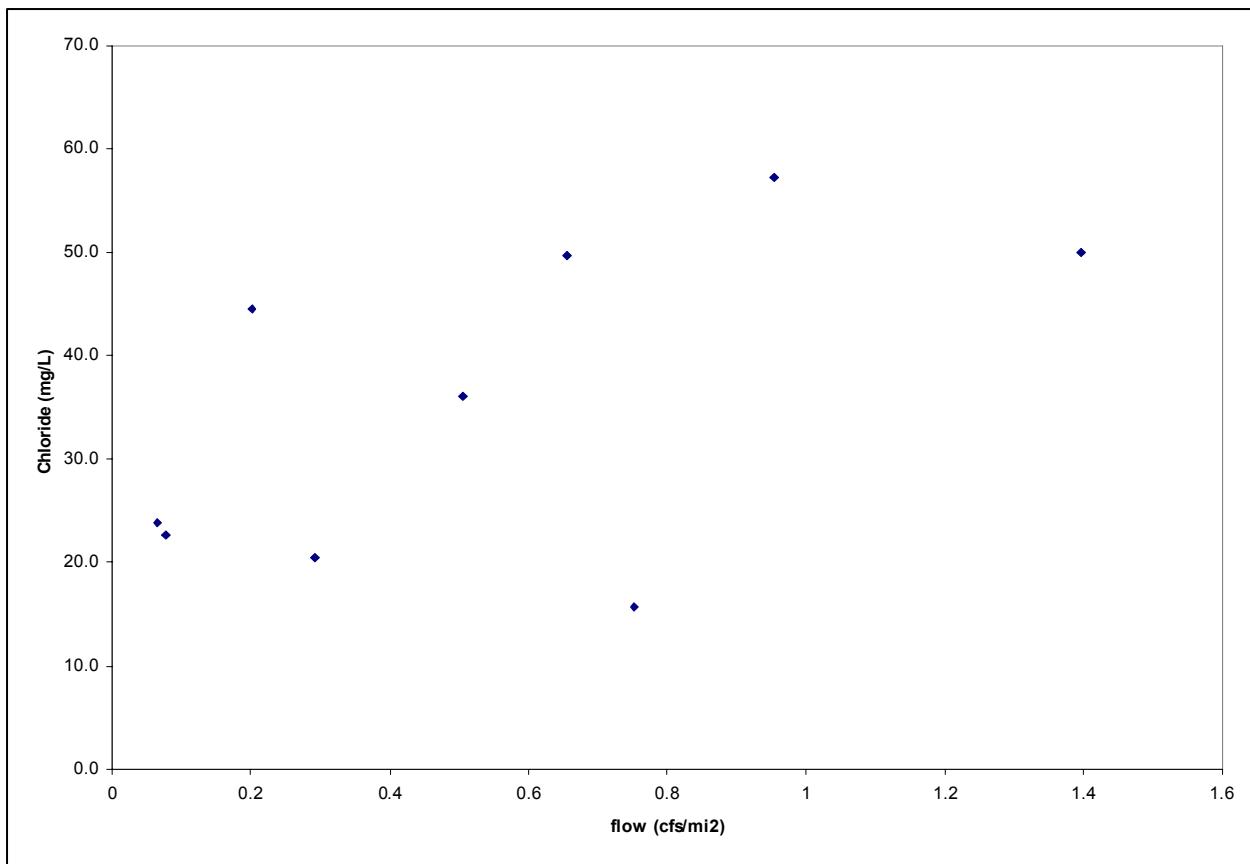


Figure D-2. Chloride versus flow at unnamed tributary of Grand Bayou (subsegment 100710) near Hall Summit, Louisiana (station 1195).

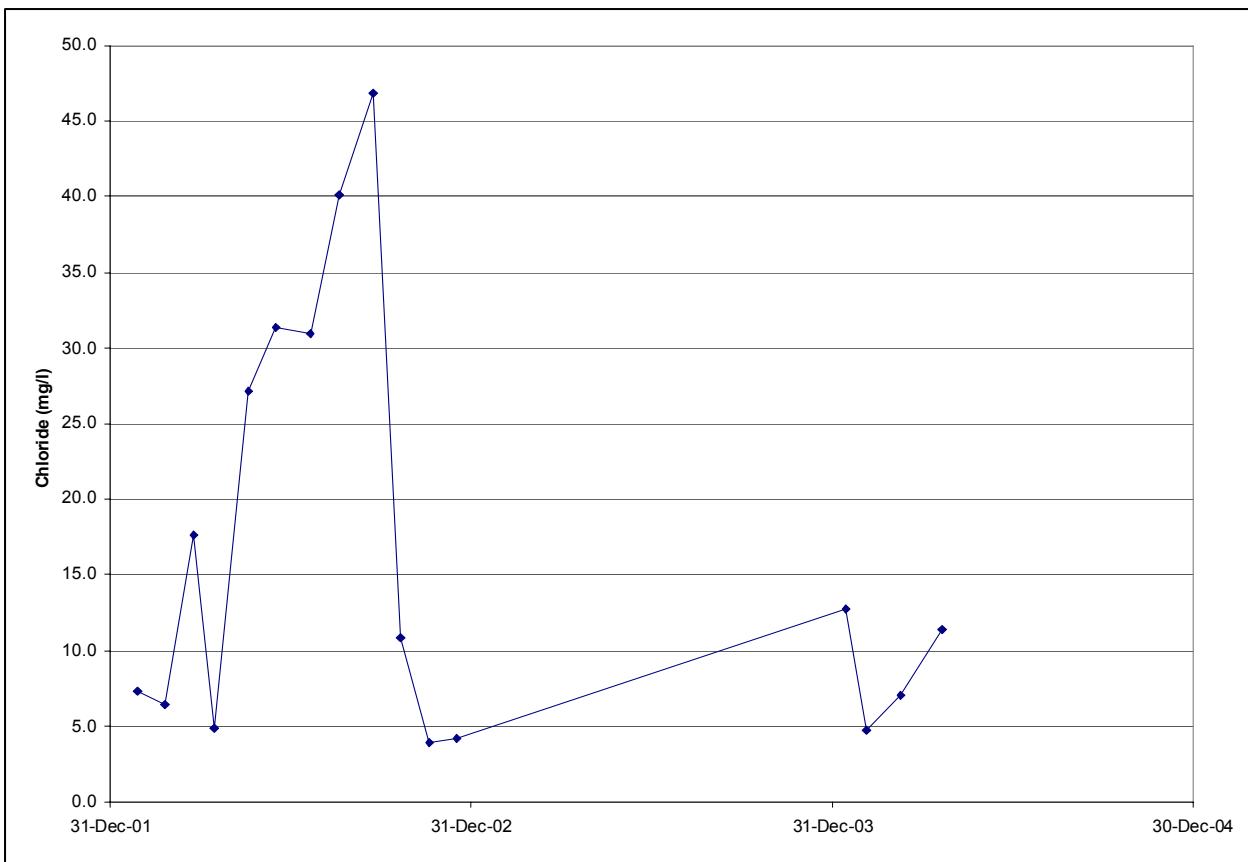


Figure D-3. Chloride observations at Cane River (subsegment 101101) west of Colfax, Louisiana (station 1217).

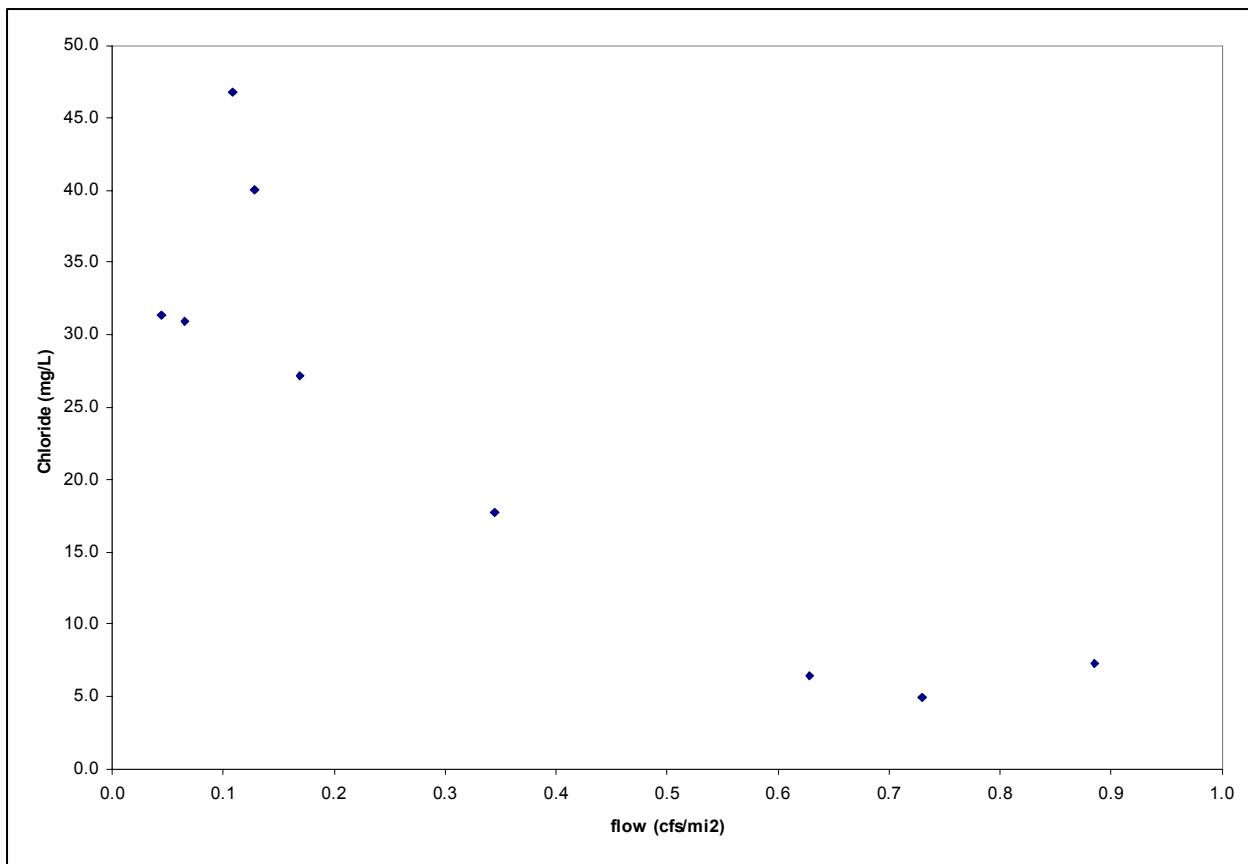


Figure D-4. Chloride versus flow at Cane River (subsegment 101101) west of Colfax, Louisiana (station 1217).

Appendix E

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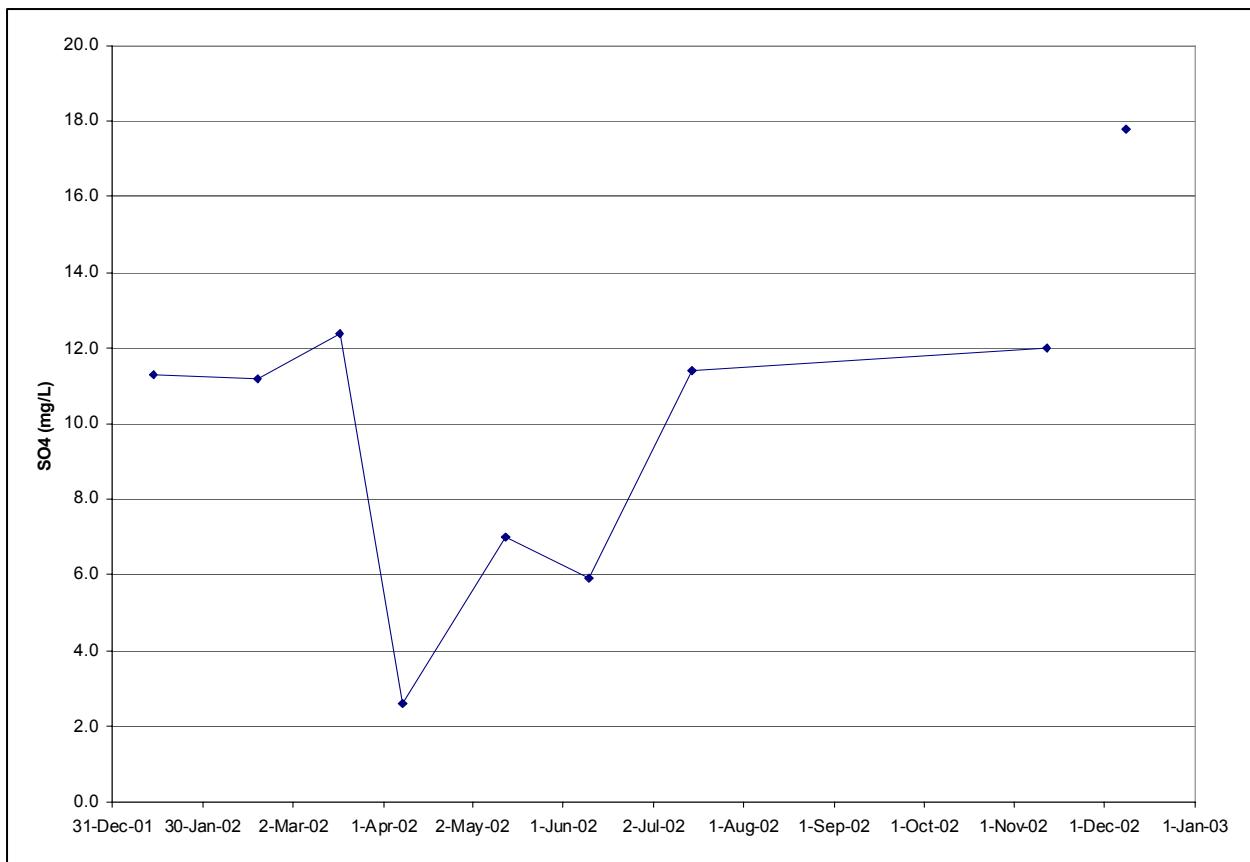


Figure E-1. Sulfate observations at unnamed tributary of Castor Creek (subsegment 100708) near Castor, Louisiana (station 1194).

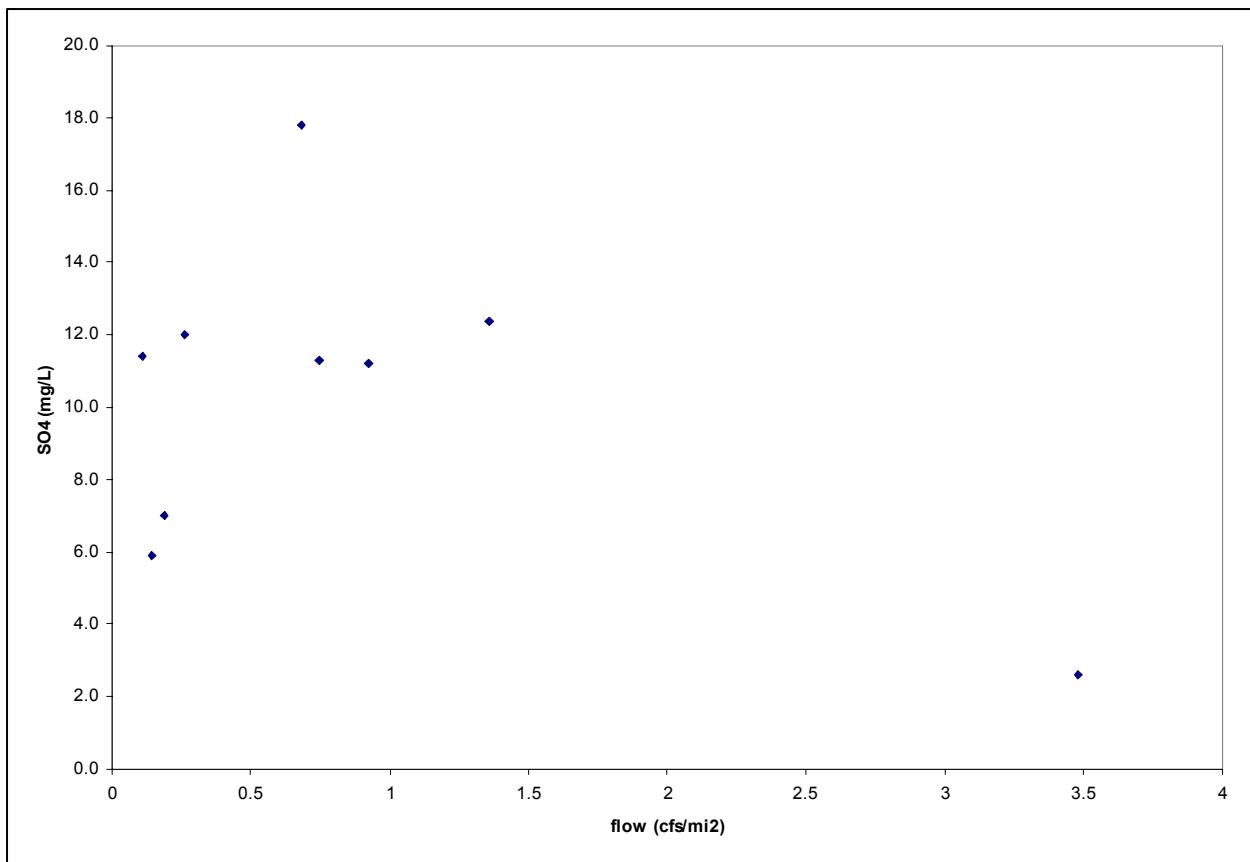


Figure E-2. Sulfate versus flow at unnamed tributary of Castor Creek (subsegment 100708) near Castor, Louisiana (station 1194).

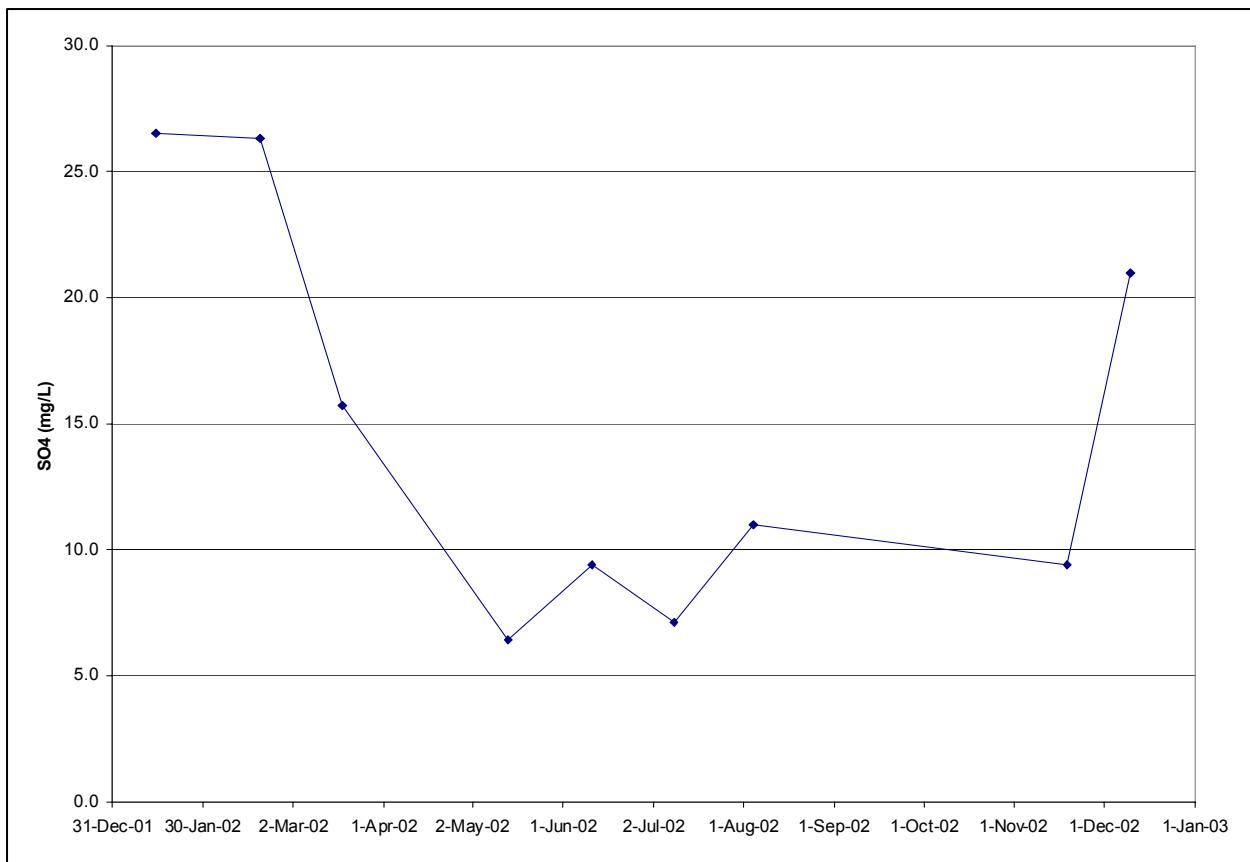


Figure E-3. Sulfate observations at unnamed tributary of Grand Bayou (subsegment 100710) near Hall Summit, Louisiana (station 1195).

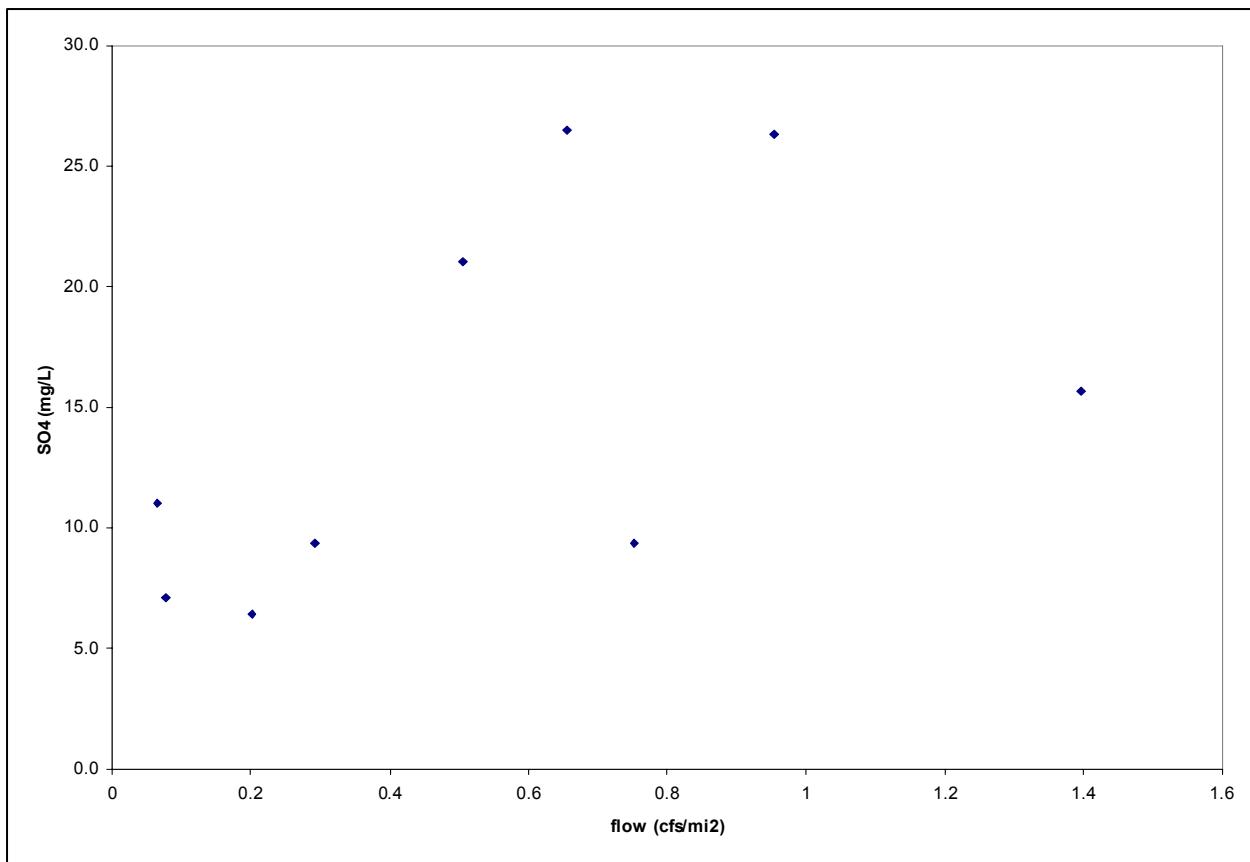


Figure E-4. Sulfate versus flow at unnamed tributary of Grand Bayou (subsegment 100710) near Hall Summit, Louisiana (station 1195).

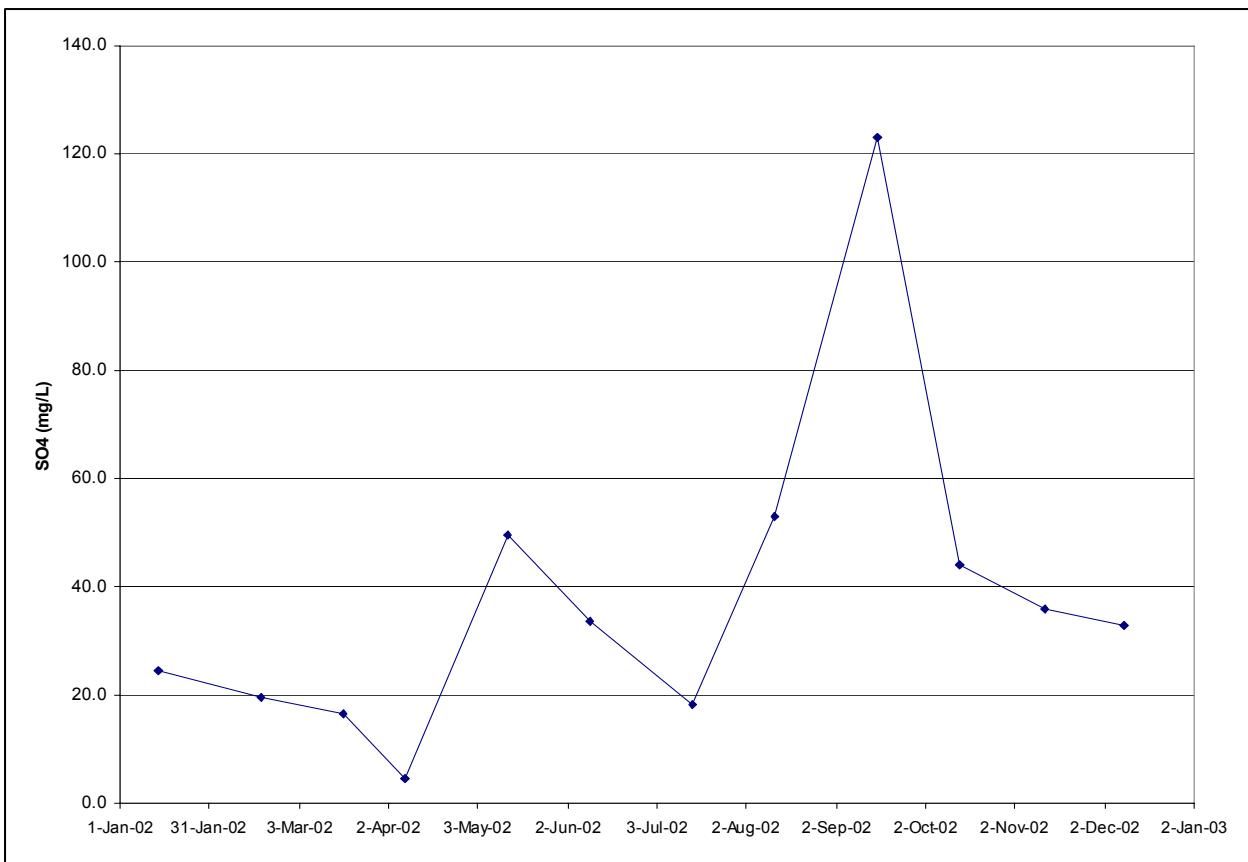


Figure E-5. Sulfate observations at unnamed tributary of Saline Bayou (subsegment 100804) near Arcadia, Louisiana (station 1206).

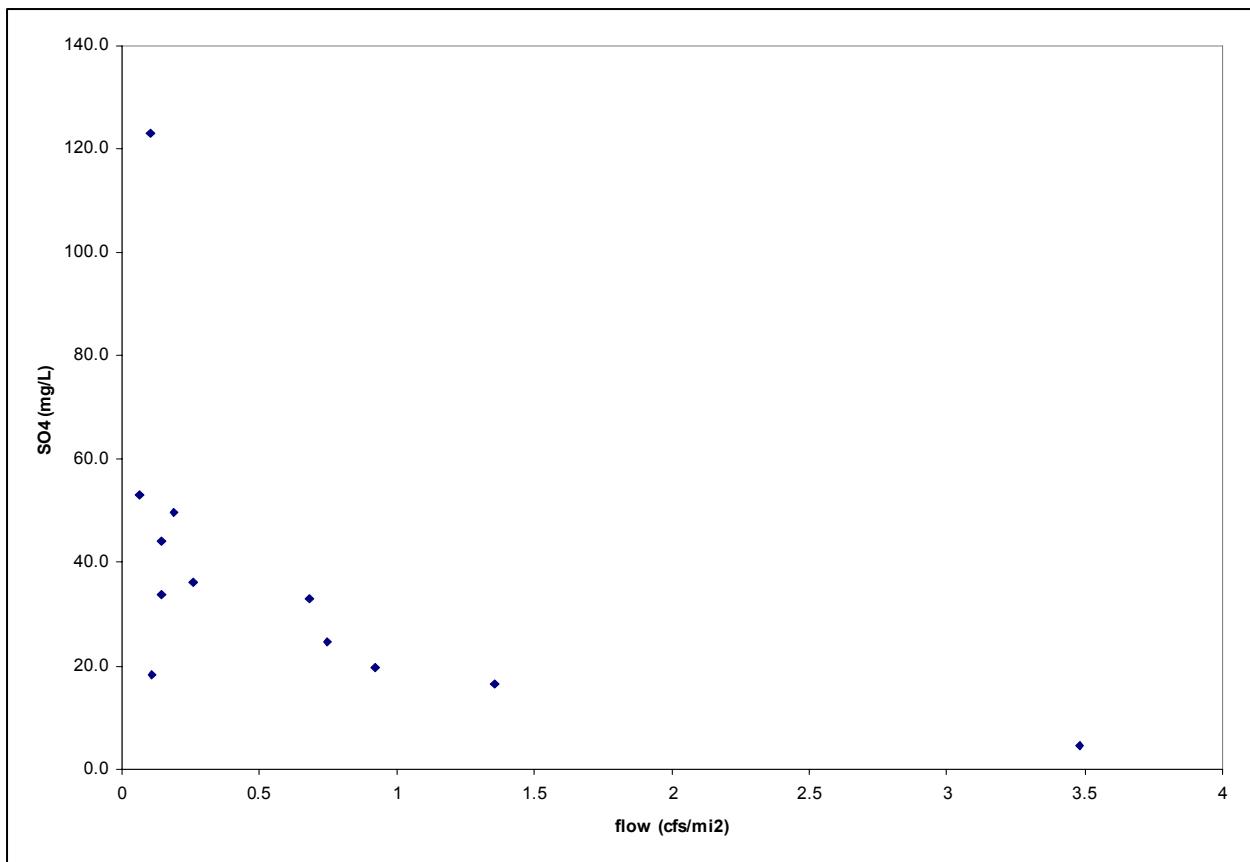


Figure E-6. Sulfate versus flow at unnamed tributary of Saline Bayou (subsegment 100804) near Arcadia, Louisiana (station 1206).

Appendix F

Total Dissolved Solids Figures for the Red River Basin

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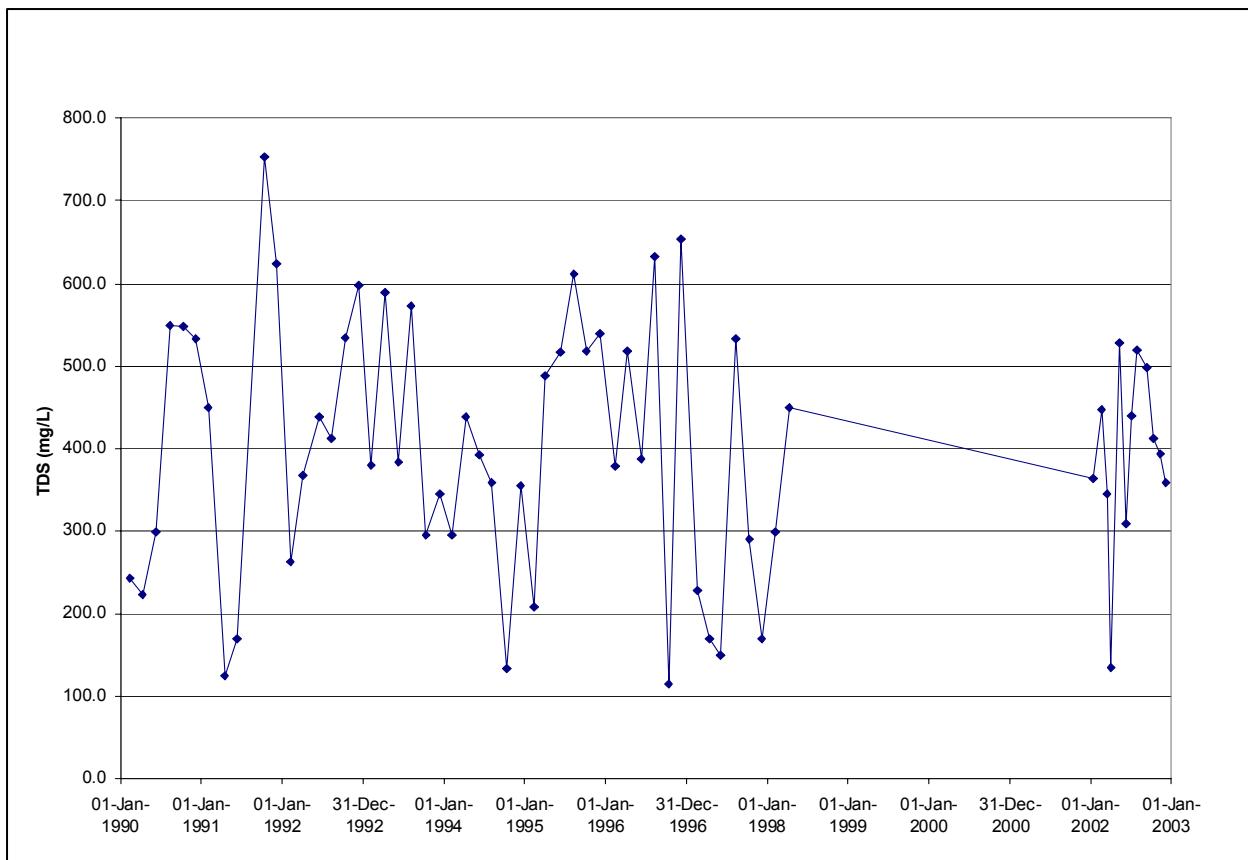


Figure F-1. TDS observations at Flat River (subsegment 100406) east of Taylortown, Louisiana (station 272).

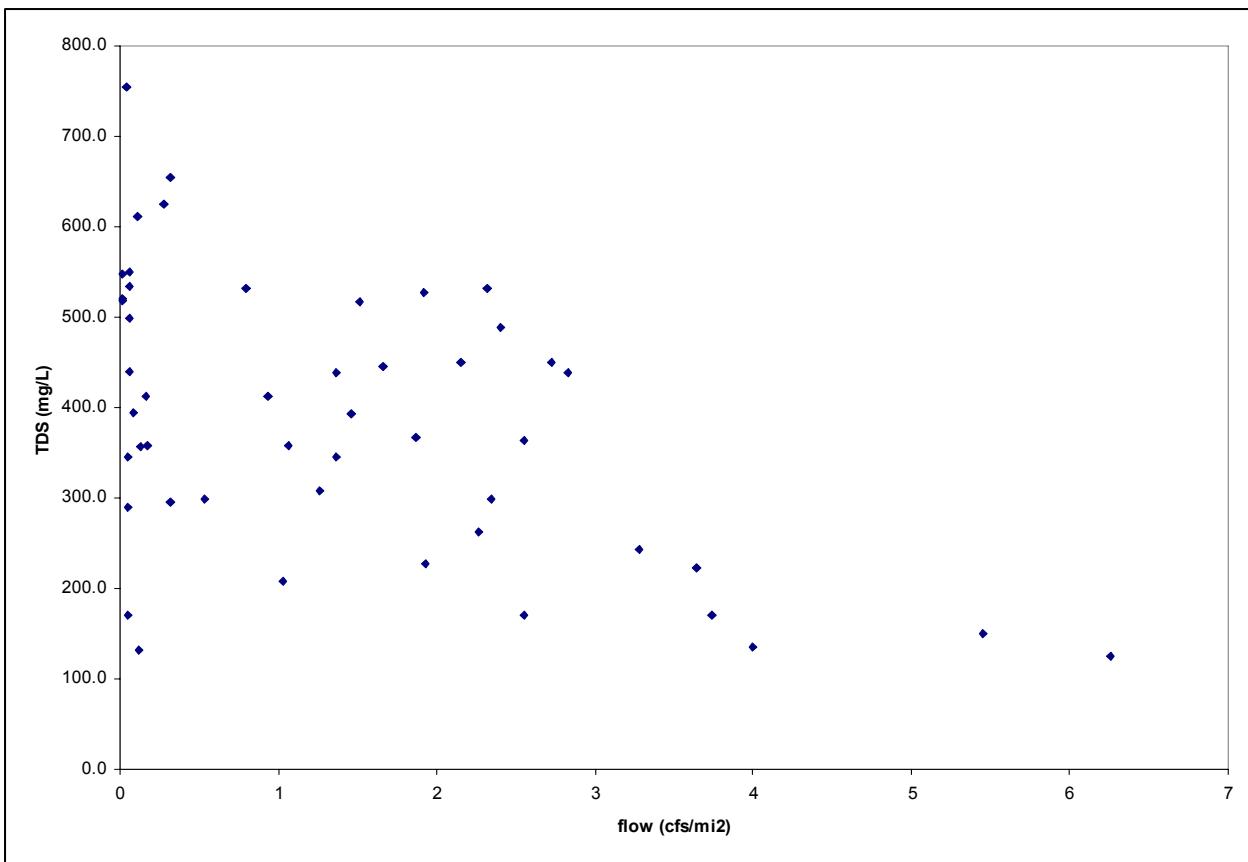


Figure F-2. TDS versus flow at Flat River (subsegment 100406) east of Taylortown, Louisiana (station 272).

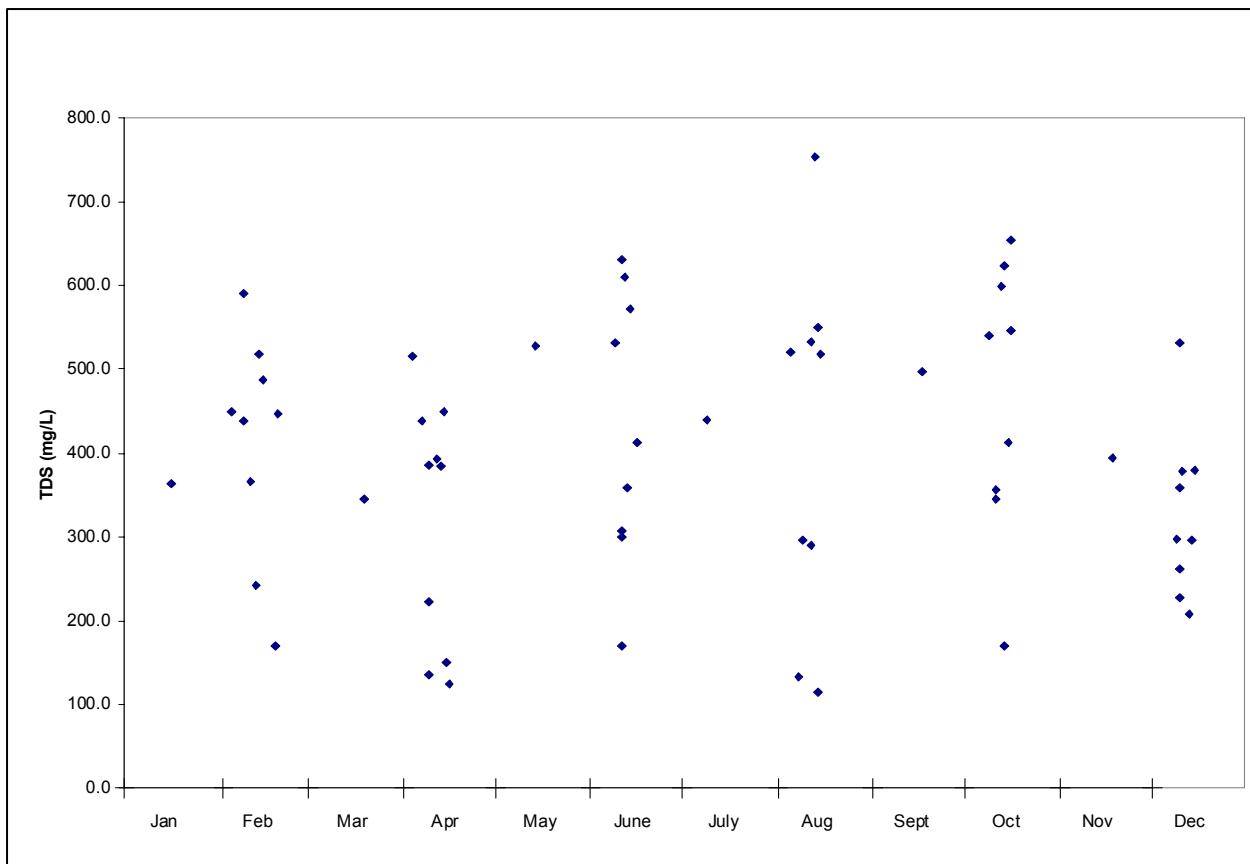


Figure F-3. TDS by season at Flat River (subsegment 100406) east of Taylortown, Louisiana (station 272).

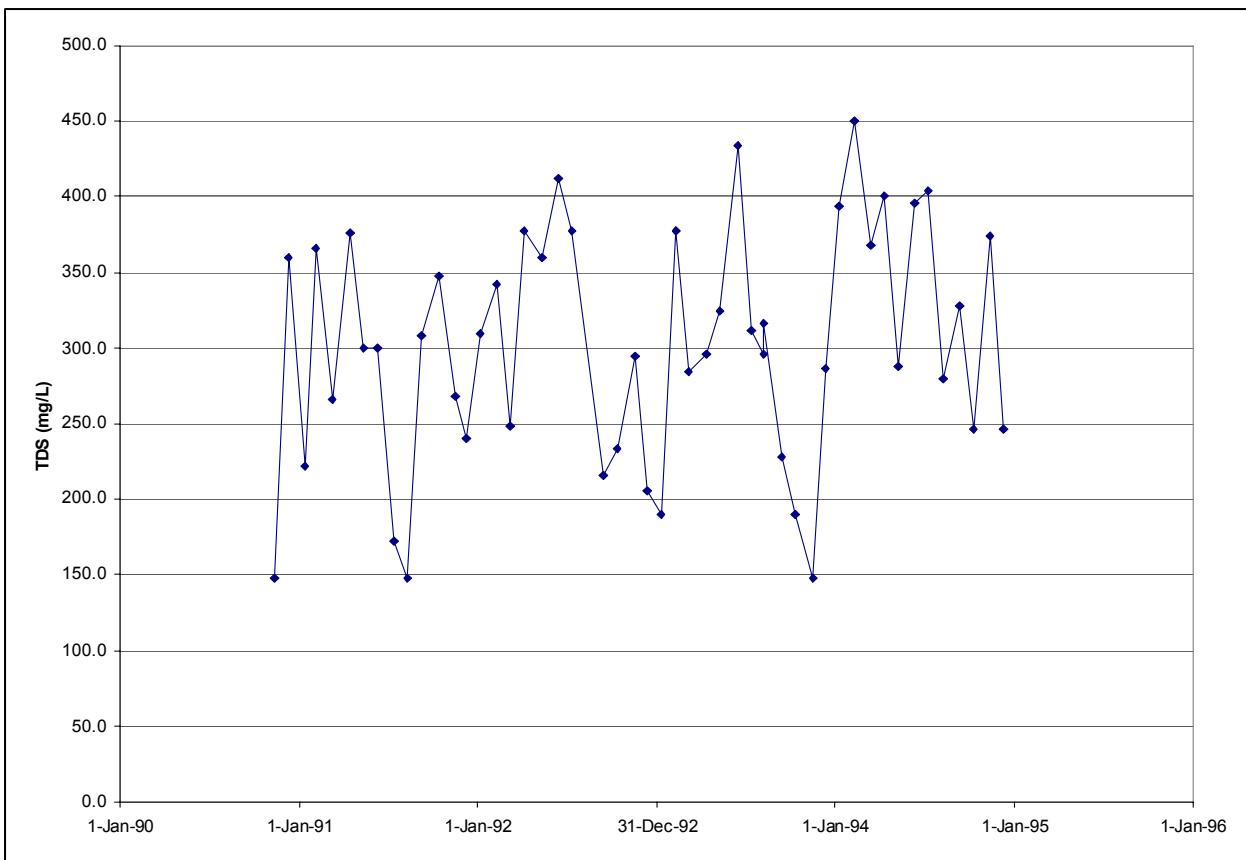


Figure F-4. TDS observations at Flat River Drainage Canal (subsegment 100406) north of Bossier City, Louisiana (station 363).

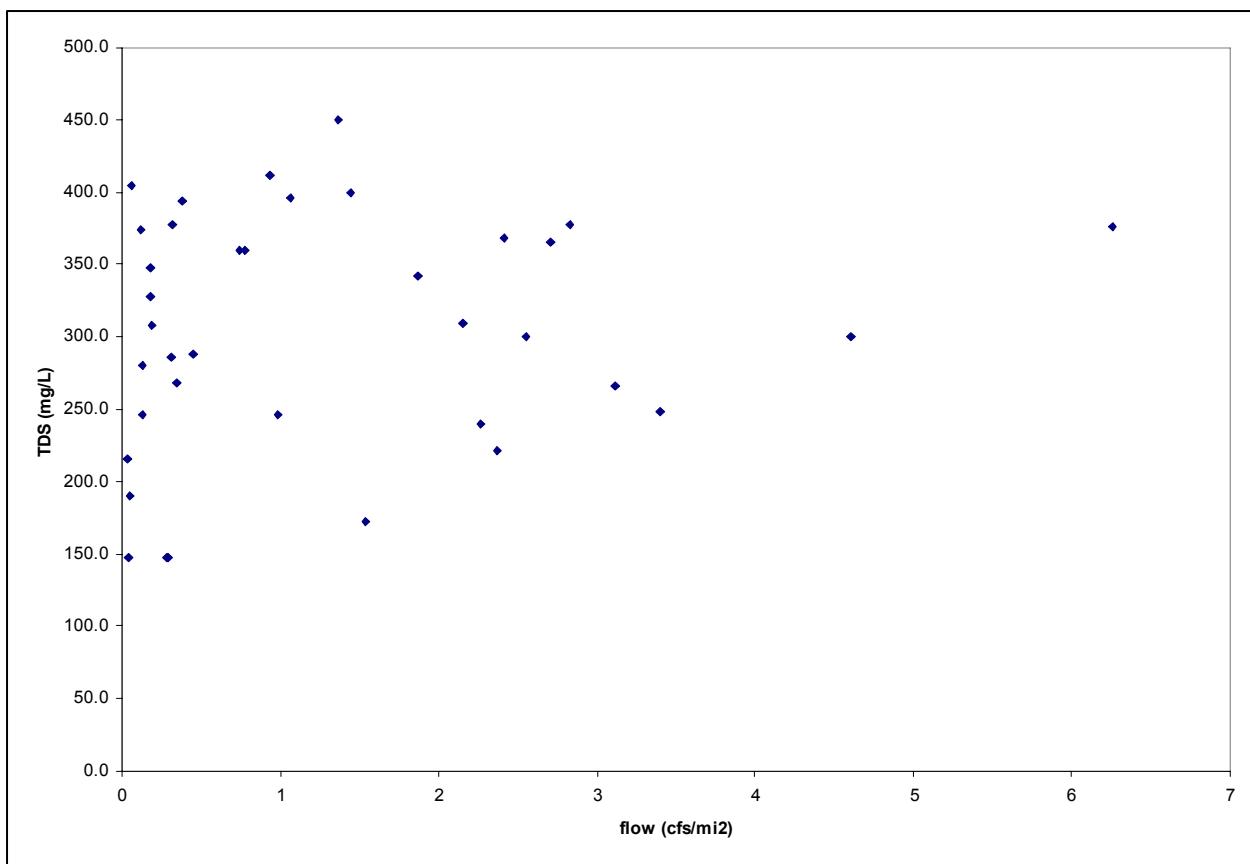


Figure F-5. TDS versus flow at Flat River Drainage Canal (subsegment 100406) north of Bossier City, Louisiana (station 363).

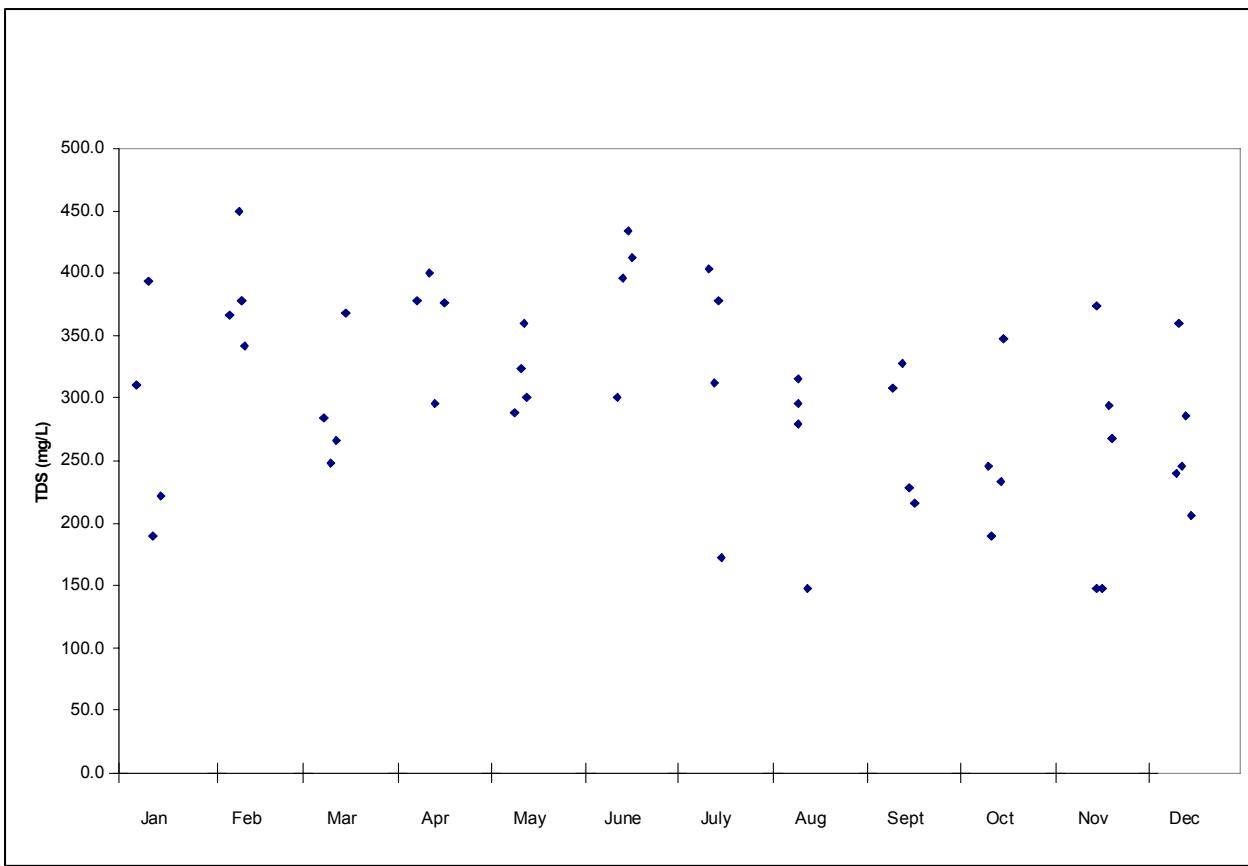


Figure F-6. TDS by season at Flat River Drainage Canal (subsegment 100406) north of Bossier City, Louisiana (station 363).

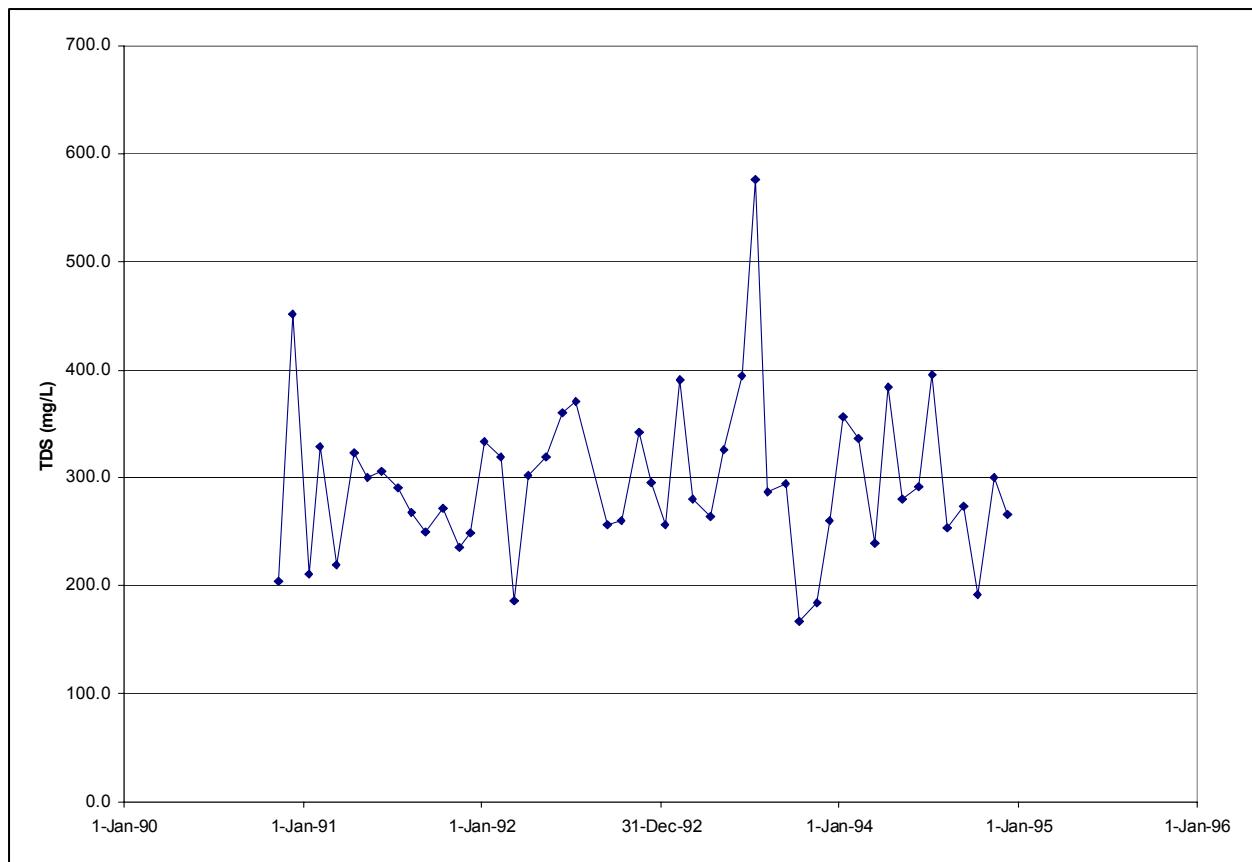


Figure F-7. TDS observations at Flat River Drainage Canal (subsegment 100406) northeast of Bossier City, Louisiana (station 389).

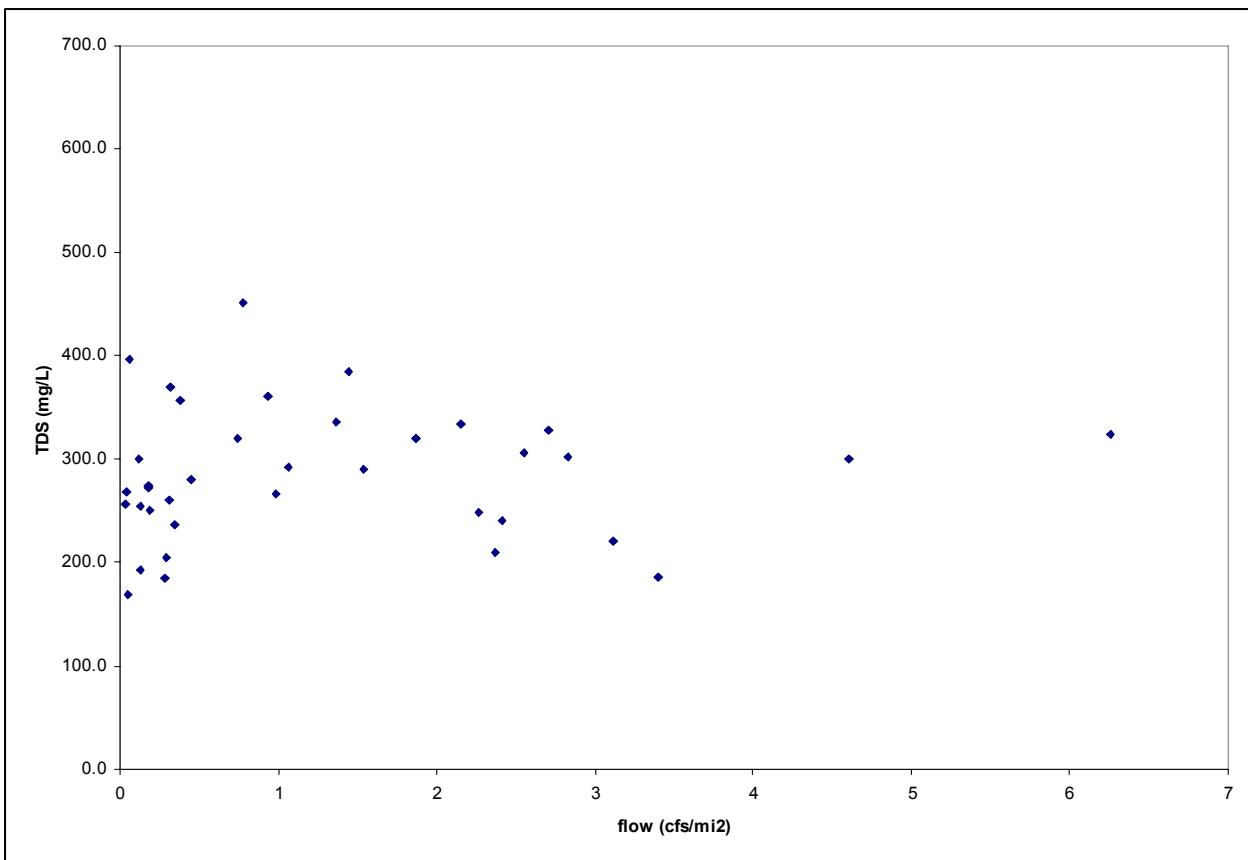


Figure F-8. TDS versus flow at Flat River Drainage Canal (subsegment 100406) northeast of Bossier City, Louisiana (station 389).

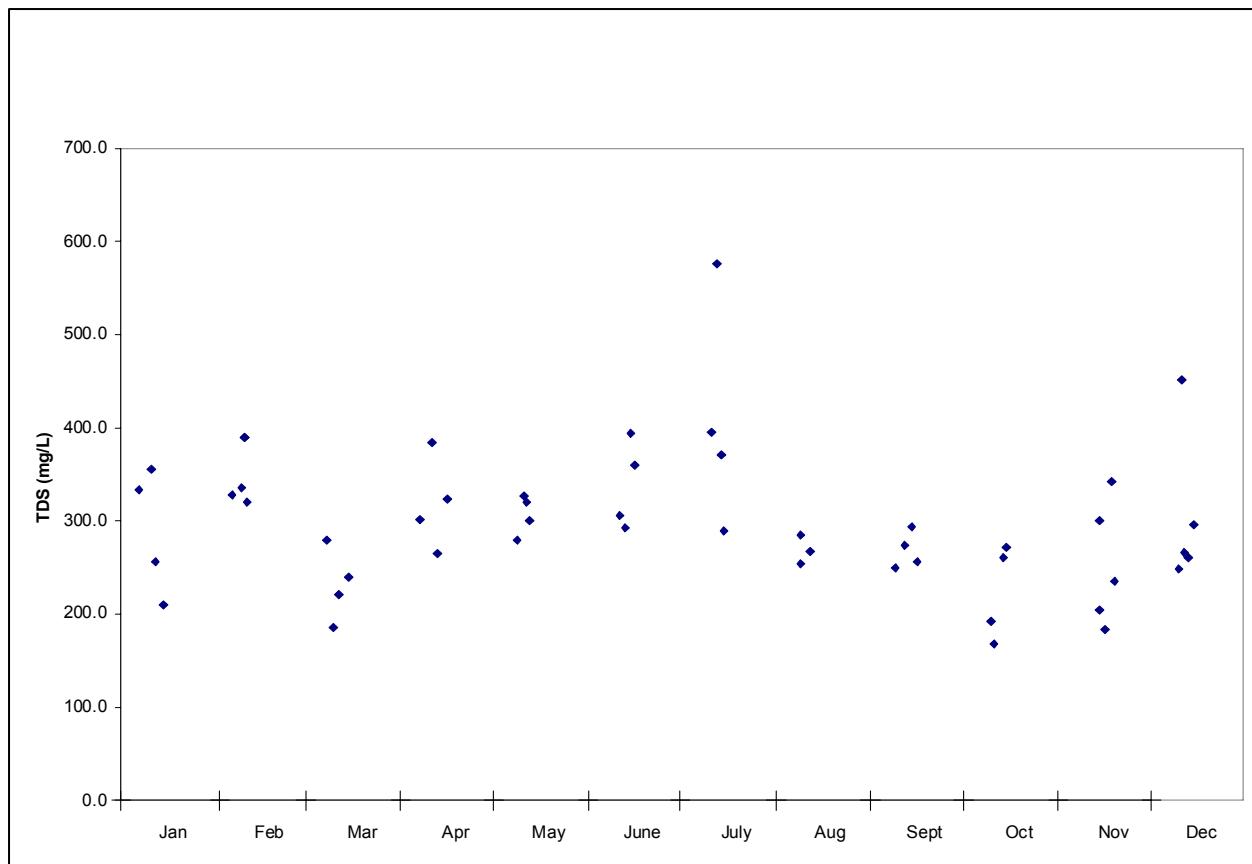


Figure F-9. TDS by season at Flat River Drainage Canal (subsegment 100406) northeast of Bossier City, Louisiana (station 389).

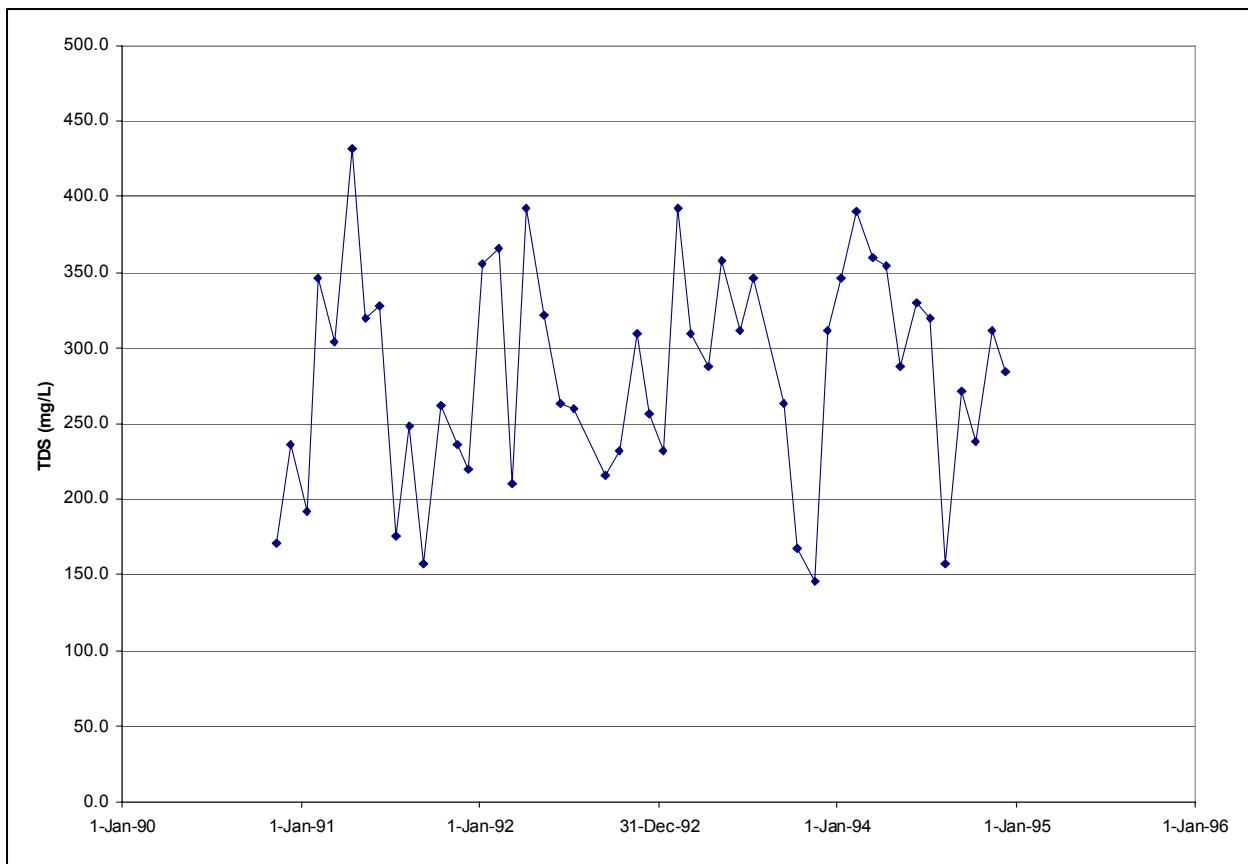


Figure F-10. TDS observations at Flat River Drainage Canal (subsegment 100406) northeast of Shreveport, Louisiana (station 390).

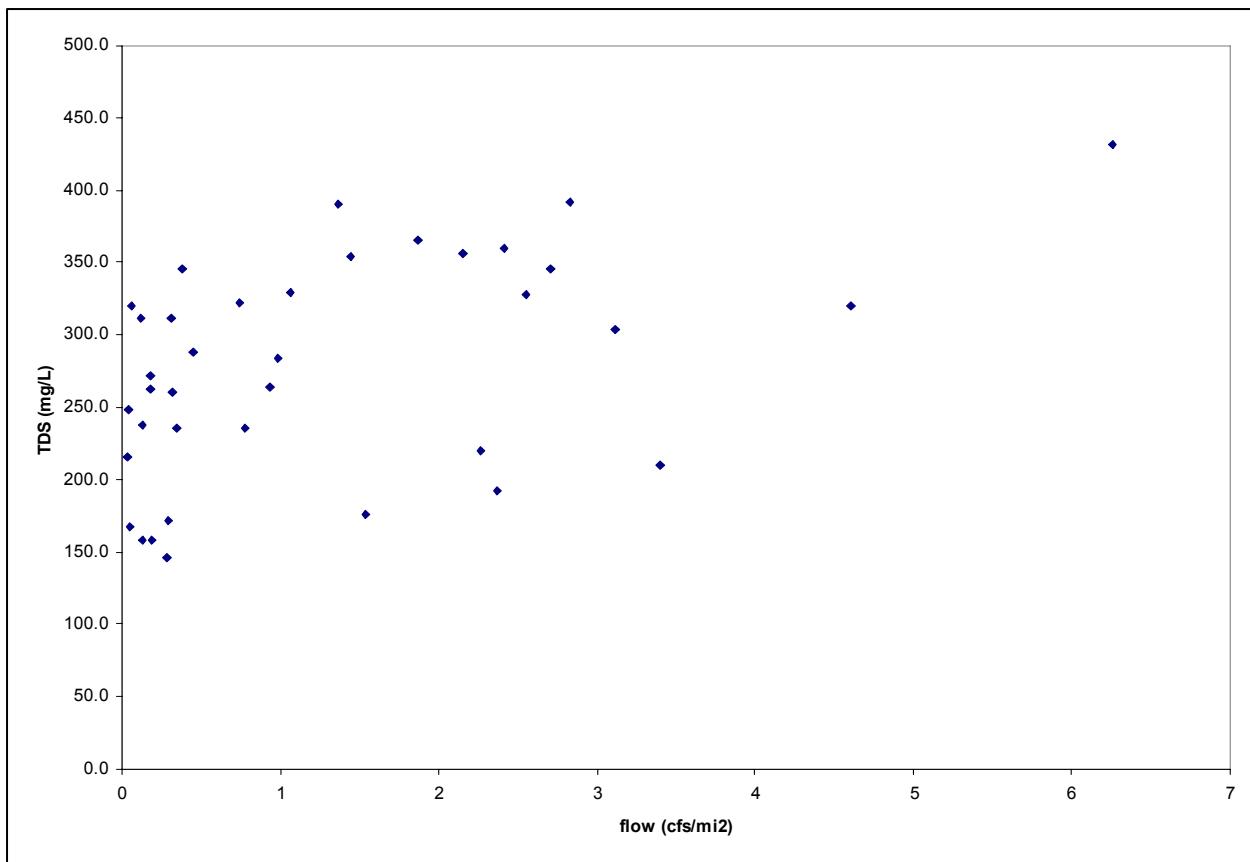


Figure F-11. TDS versus flow at Flat River Drainage Canal (subsegment 100406) northeast of Shreveport, Louisiana (station 390).

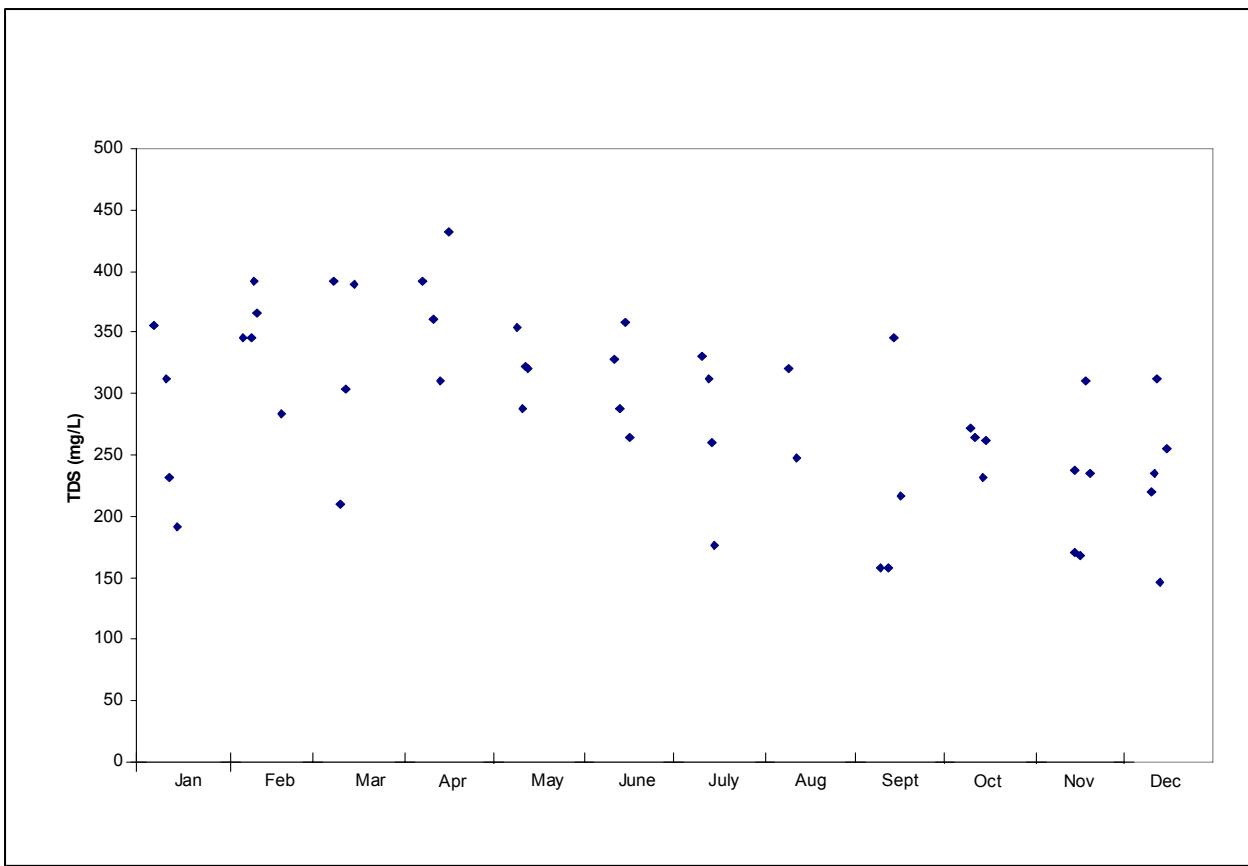


Figure F-12. TDS by season at Flat River Drainage Canal (subsegment 100406) northeast of Shreveport, Louisiana (station 390).

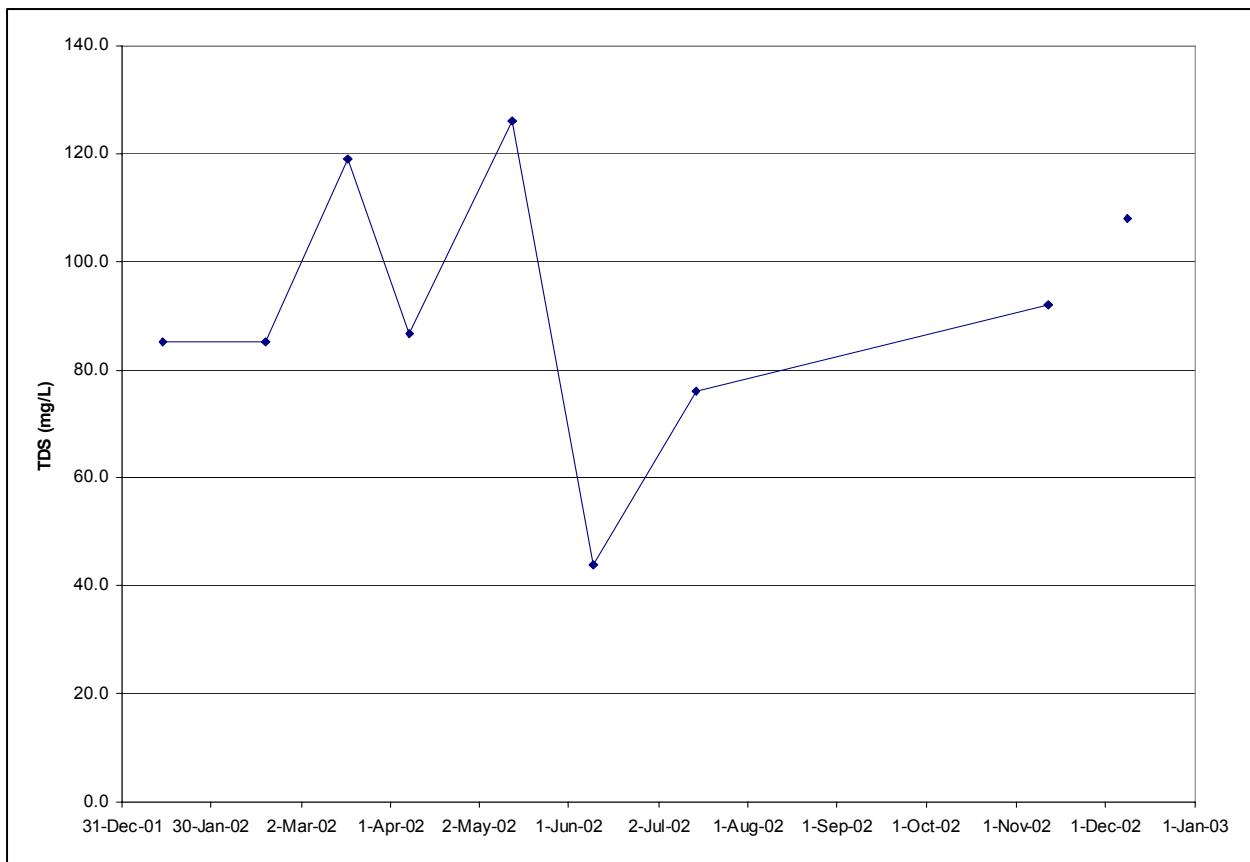


Figure F-13. TDS observations at unnamed tributary of Castor Creek (subsegment 100708) near Castor, Louisiana (station 1194).

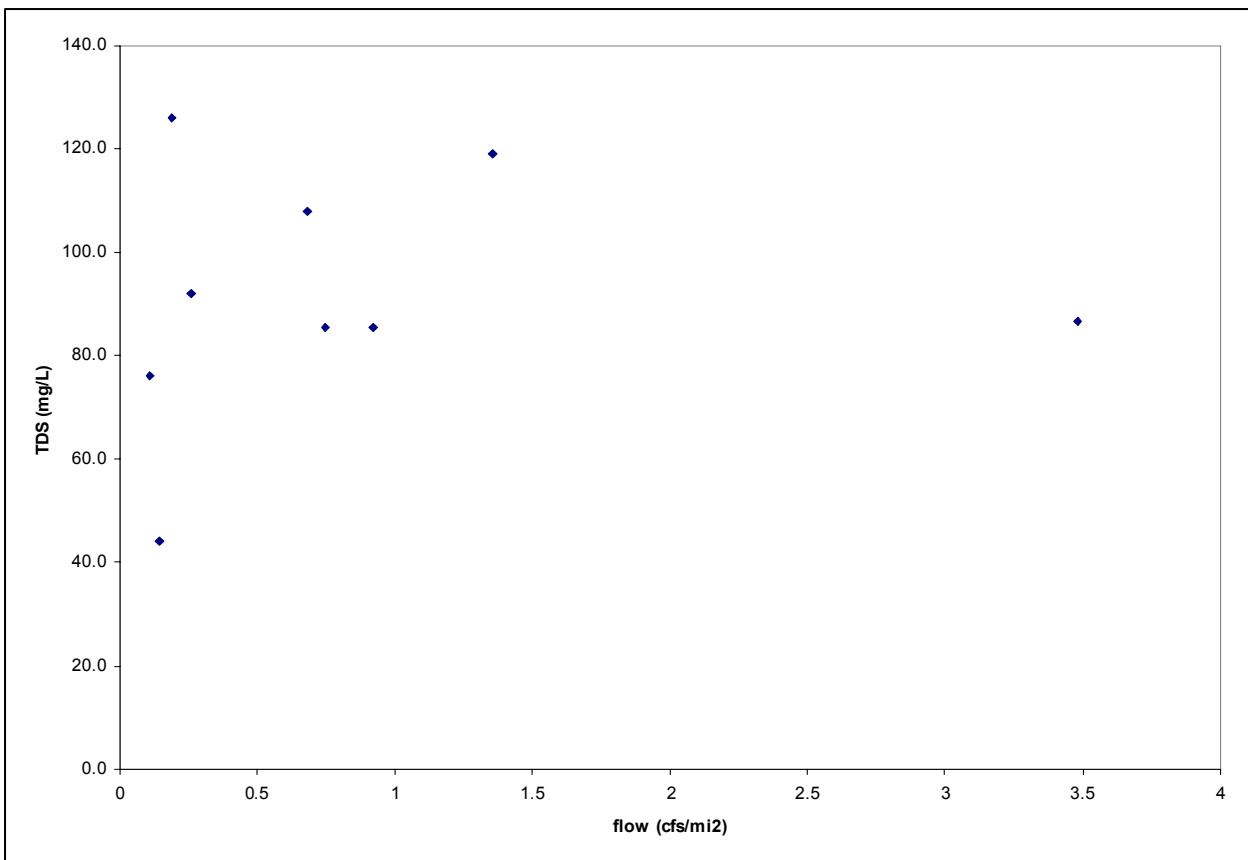


Figure F-14. TDS versus flow at unnamed tributary of Castor Creek (subsegment 100708) near Castor, Louisiana (station 1194).

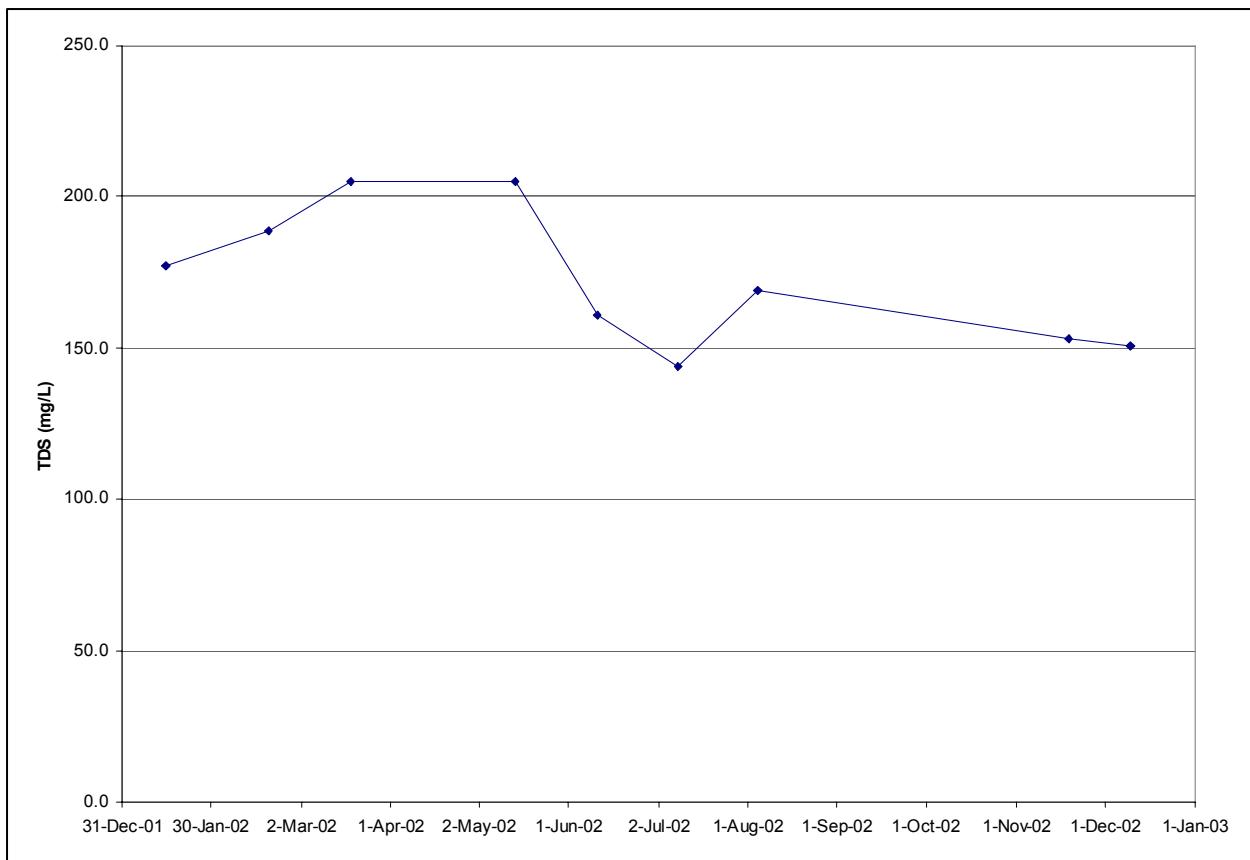


Figure F-15. TDS observations at unnamed tributary of Grand Bayou (subsegment 100710) near Hall Summit, Louisiana (station 1195).

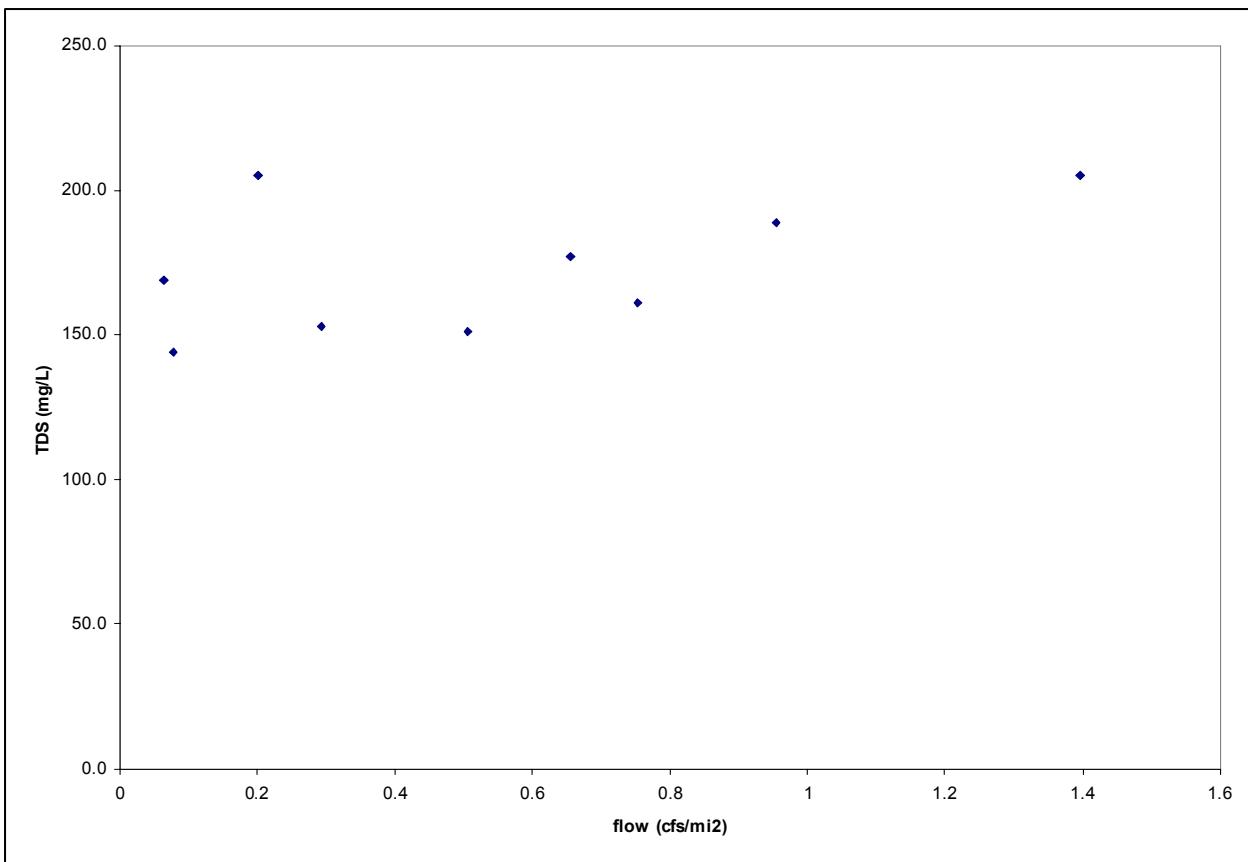


Figure F-16. TDS versus flow at unnamed tributary of Grand Bayou (subsegment 100710) near Hall Summit, Louisiana (station 1195).

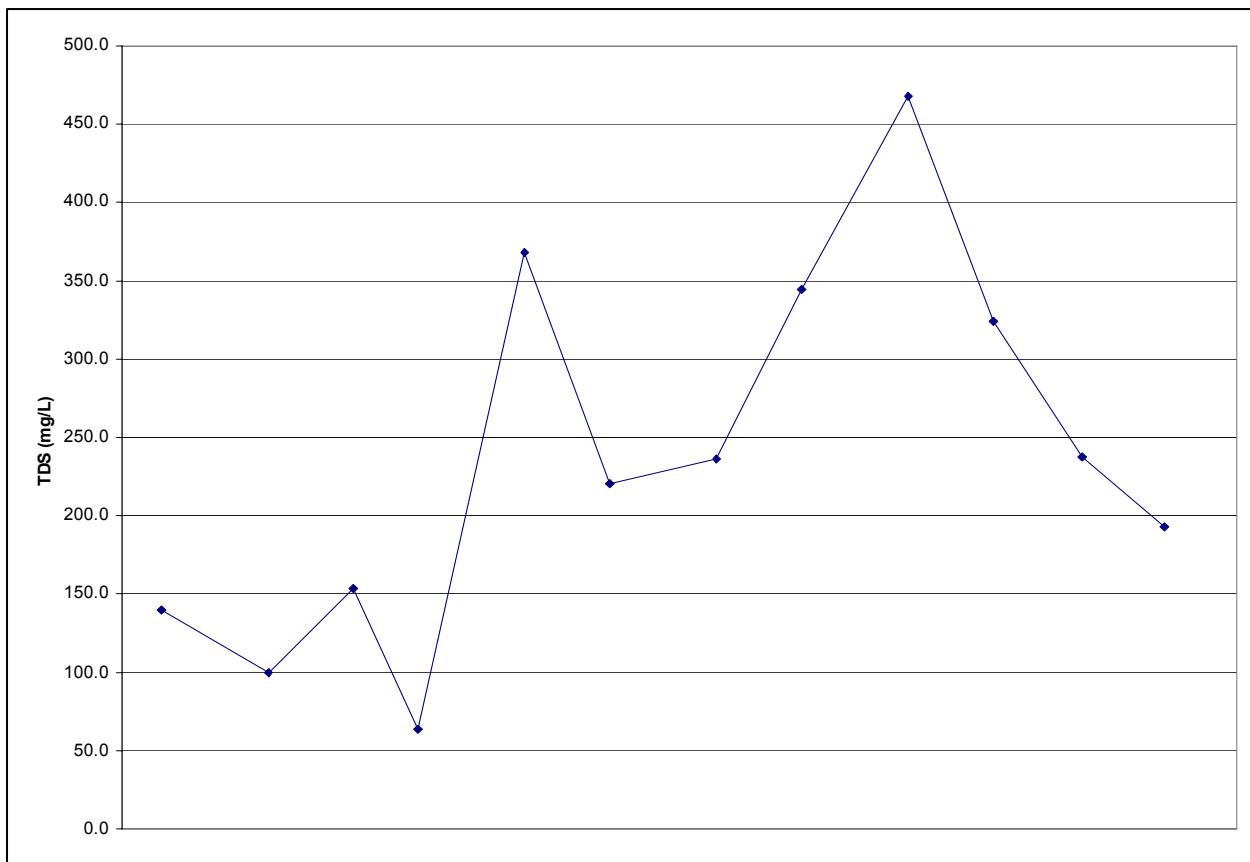


Figure F-17. TDS observations at unnamed tributary of Saline Bayou (subsegment 100804) near Arcadia, Louisiana (station 1206).

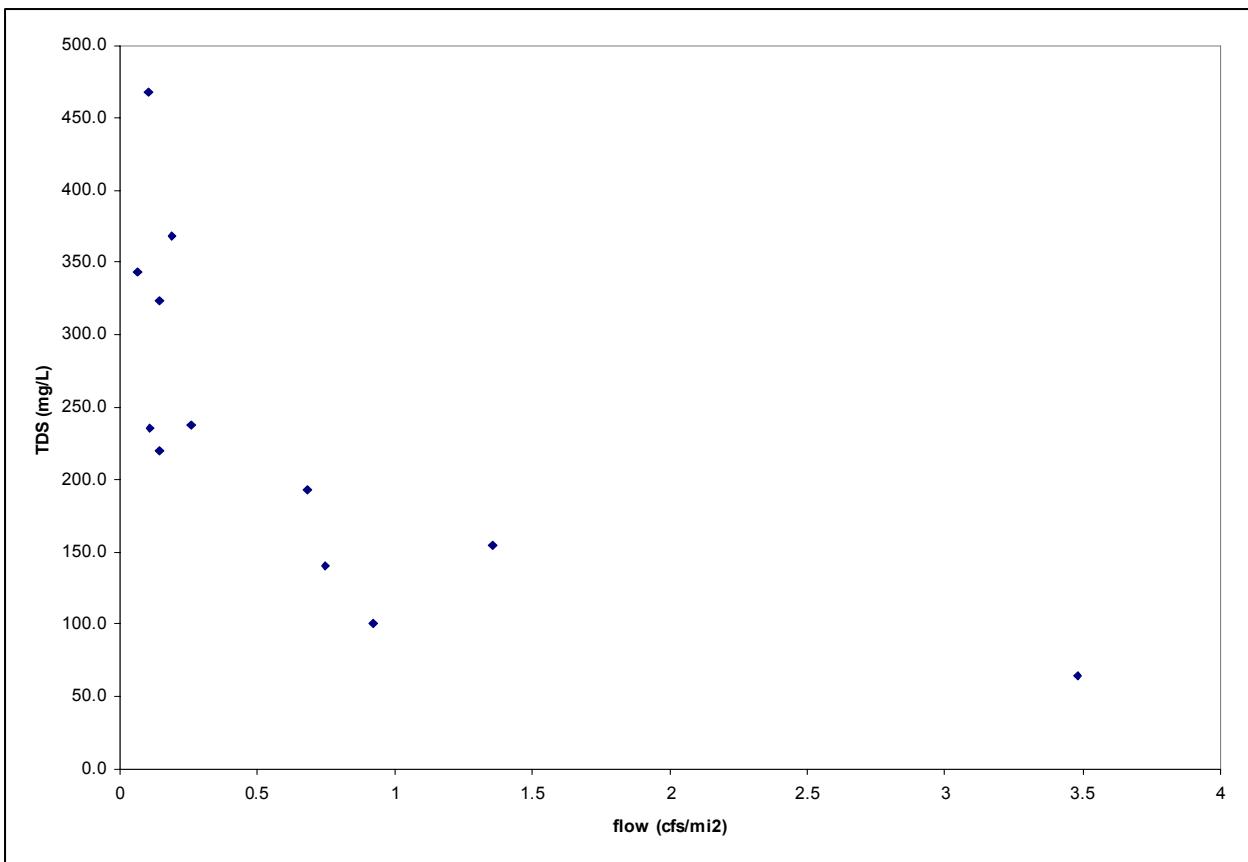


Figure F-18. TDS versus flow at unnamed tributary of Saline Bayou (subsegment 100804) near Arcadia, Louisiana (station 1206).

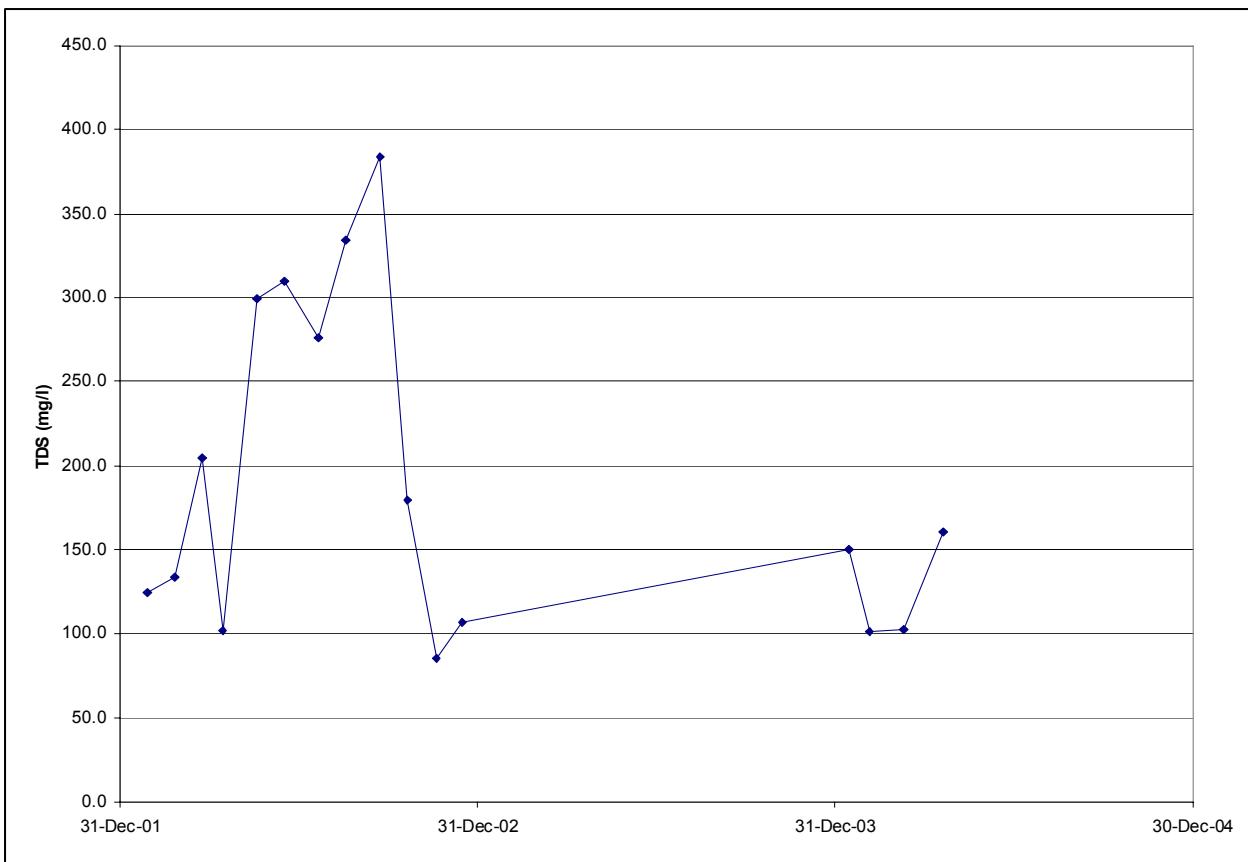


Figure F-19. TDS observations at Cane River (subsegment 101101) west of Colfax, Louisiana (station 1217).

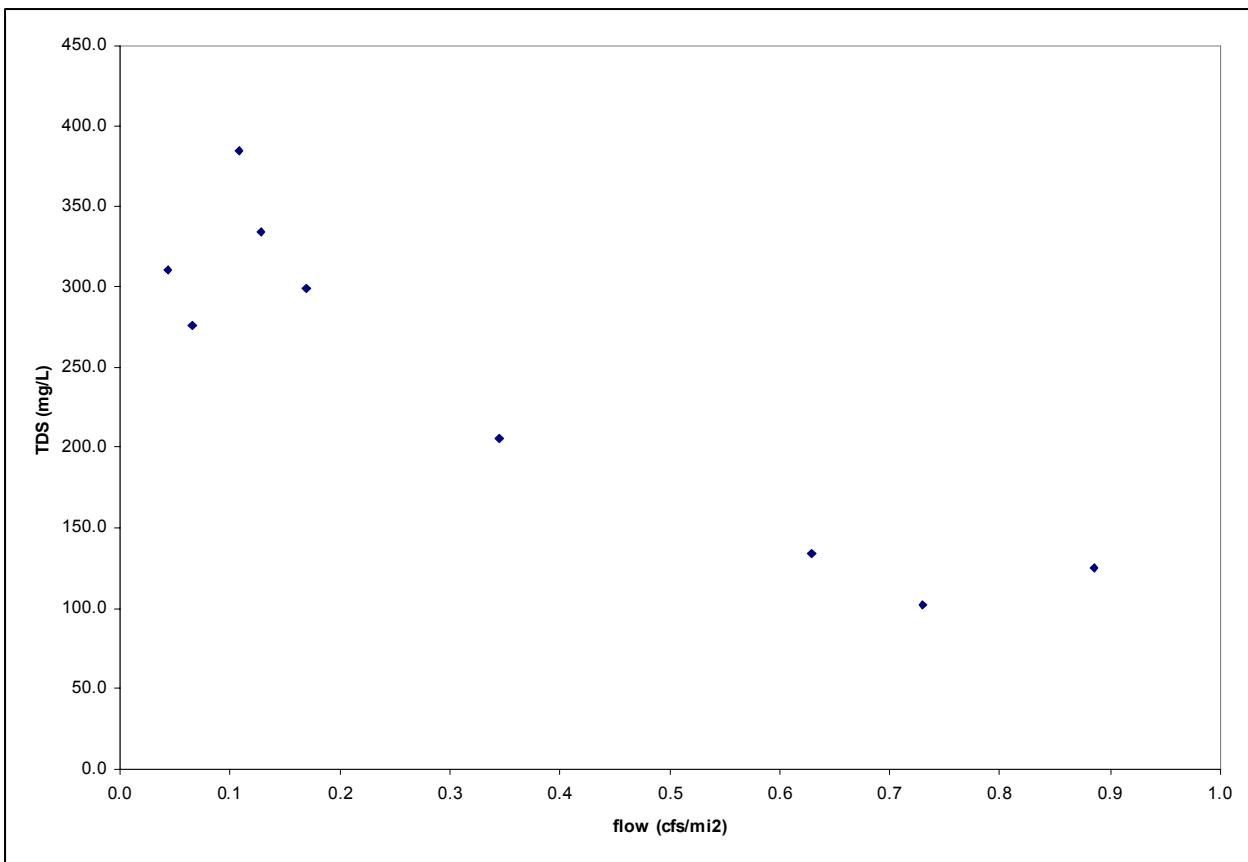


Figure F-20. TDS versus flow at Cane River (subsegment 101101) west of Colfax, Louisiana (station 1217).

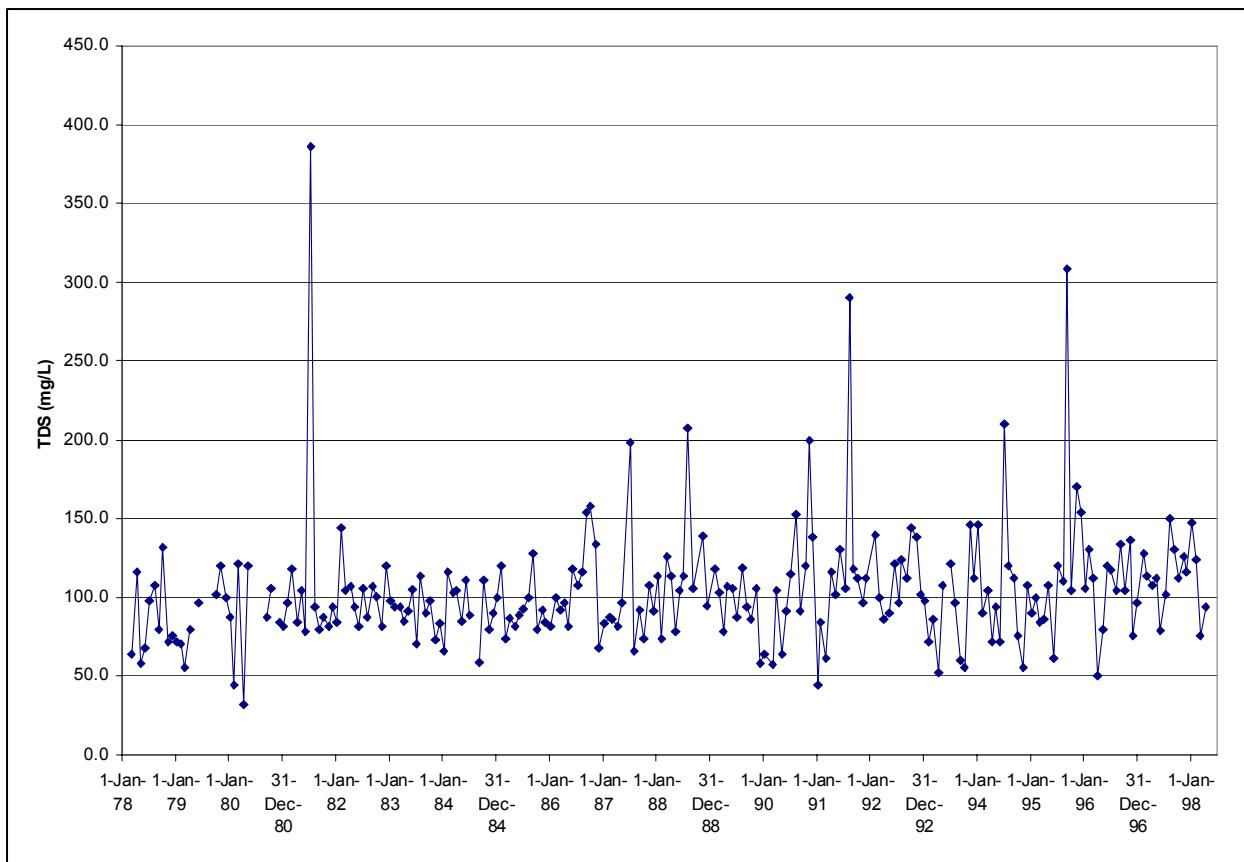


Figure F-21. TDS observations at Kisatchie Bayou (subsegment 101103) near Lotus, Louisiana (station 42).

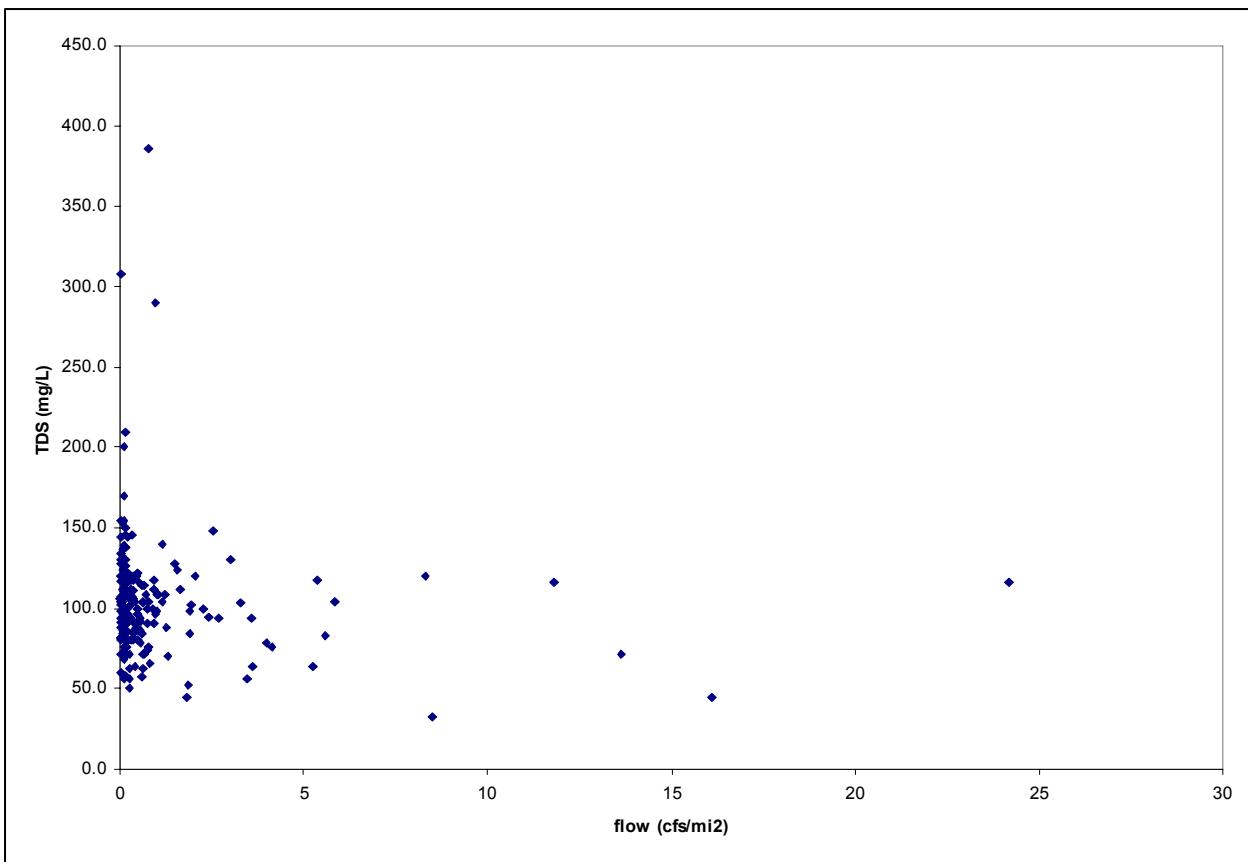


Figure F-22. TDS versus flow at Kisatchie Bayou (subsegment 101103) near Lotus, Louisiana (station 42).

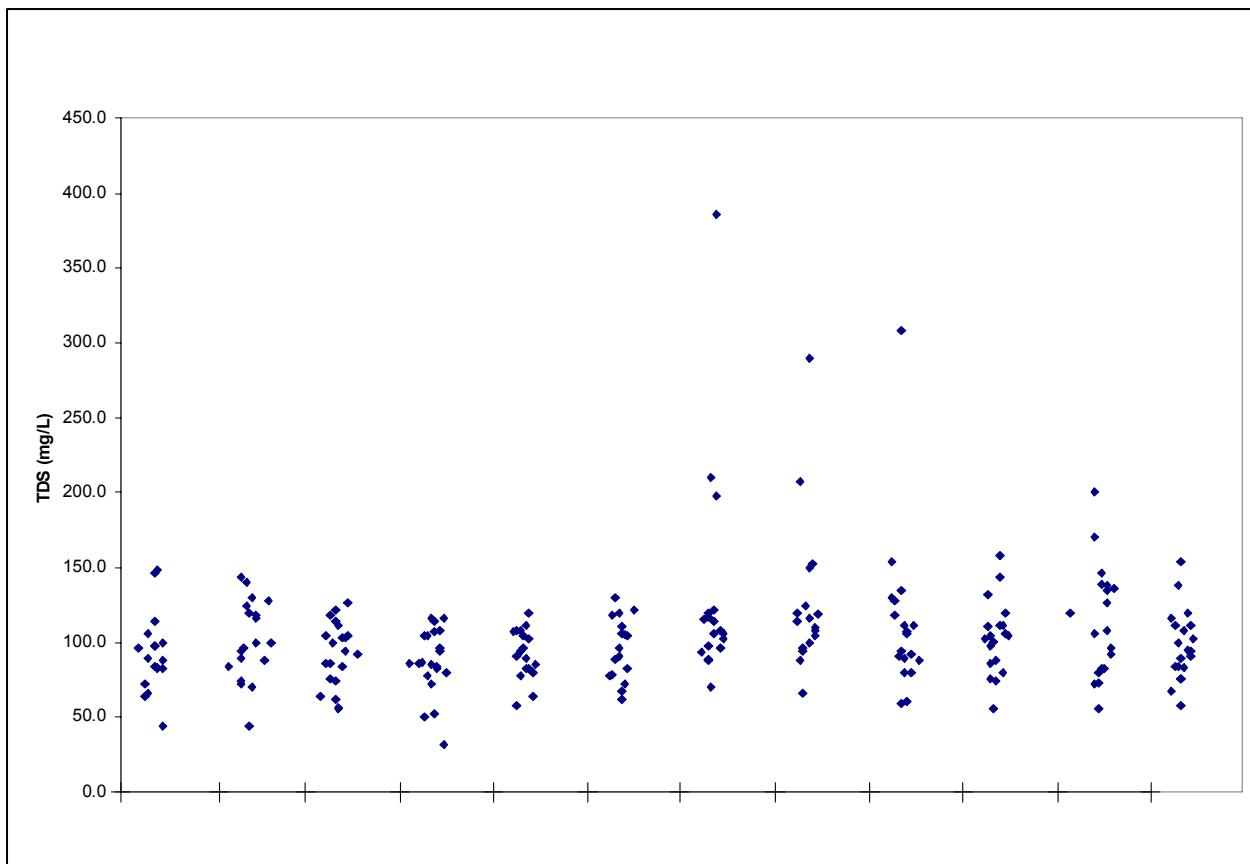


Figure F-23. TDS by season at Kisatchie Bayou (subsegment 101103) near Lotus, Louisiana (station 42).

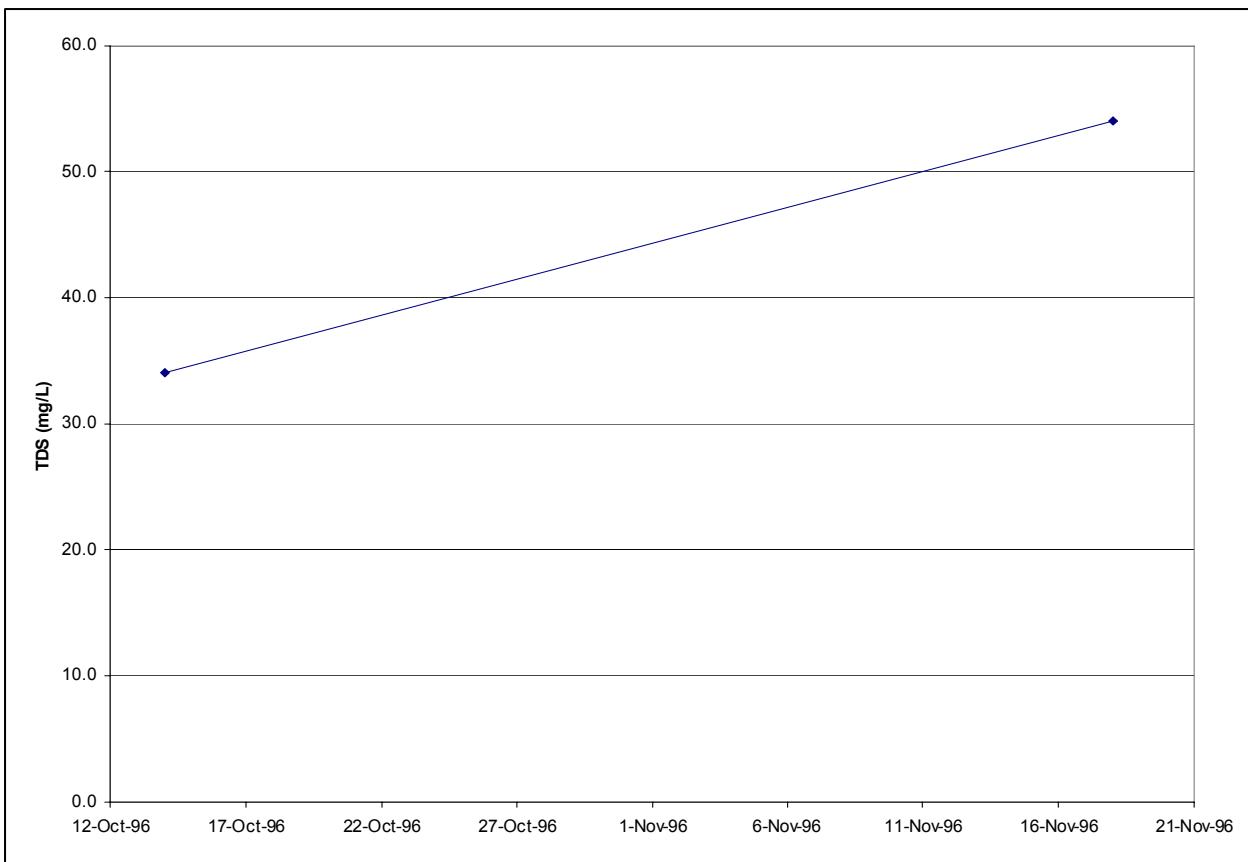


Figure F-24. TDS observations at Kisatchie Bayou (subsegment 101103) at Kisatchie, Louisiana (station 549).

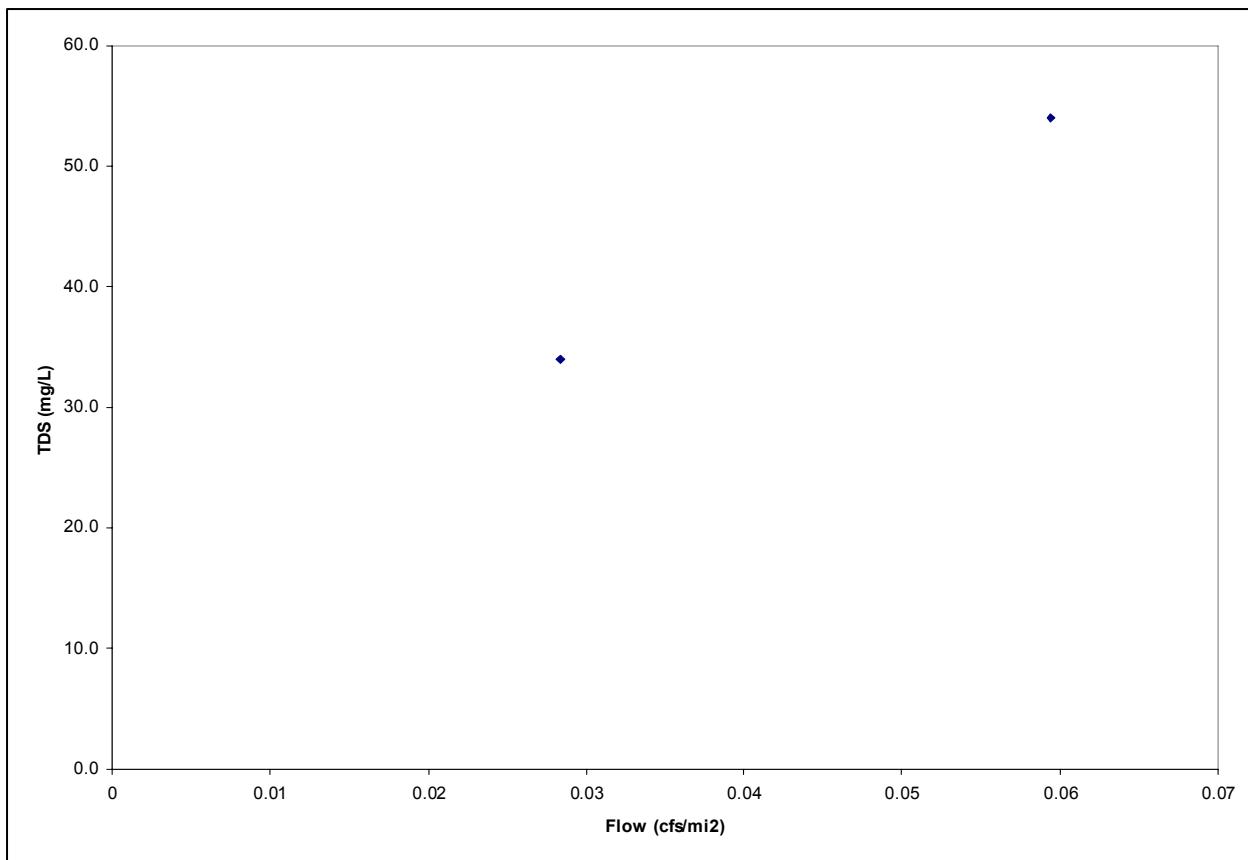


Figure F-25. TDS versus flow at Kisatchie Bayou (subsegment 101103) at Kisatchie, Louisiana (station 549).

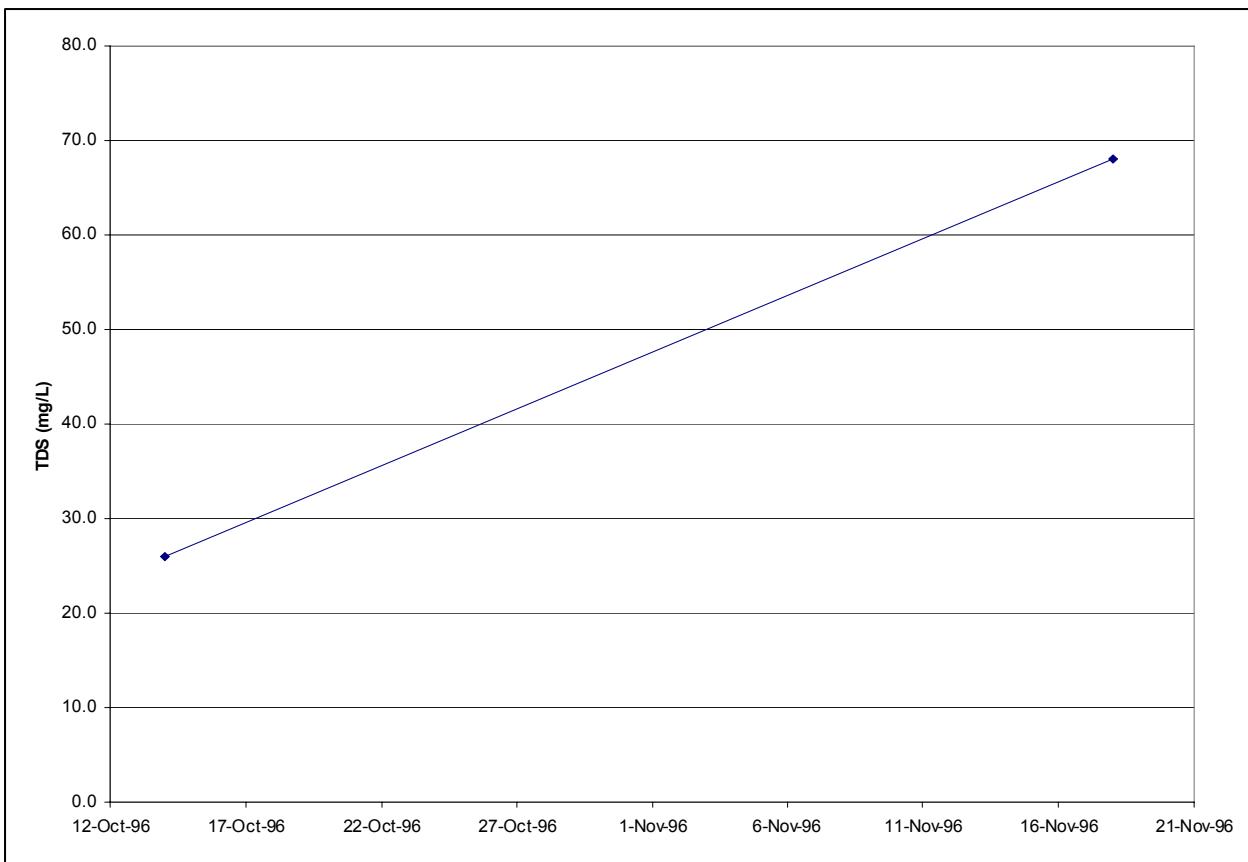


Figure F-26. TDS observations at Little Sandy Creek (subsegment 101103) at Kisatchie, Louisiana (station 550).

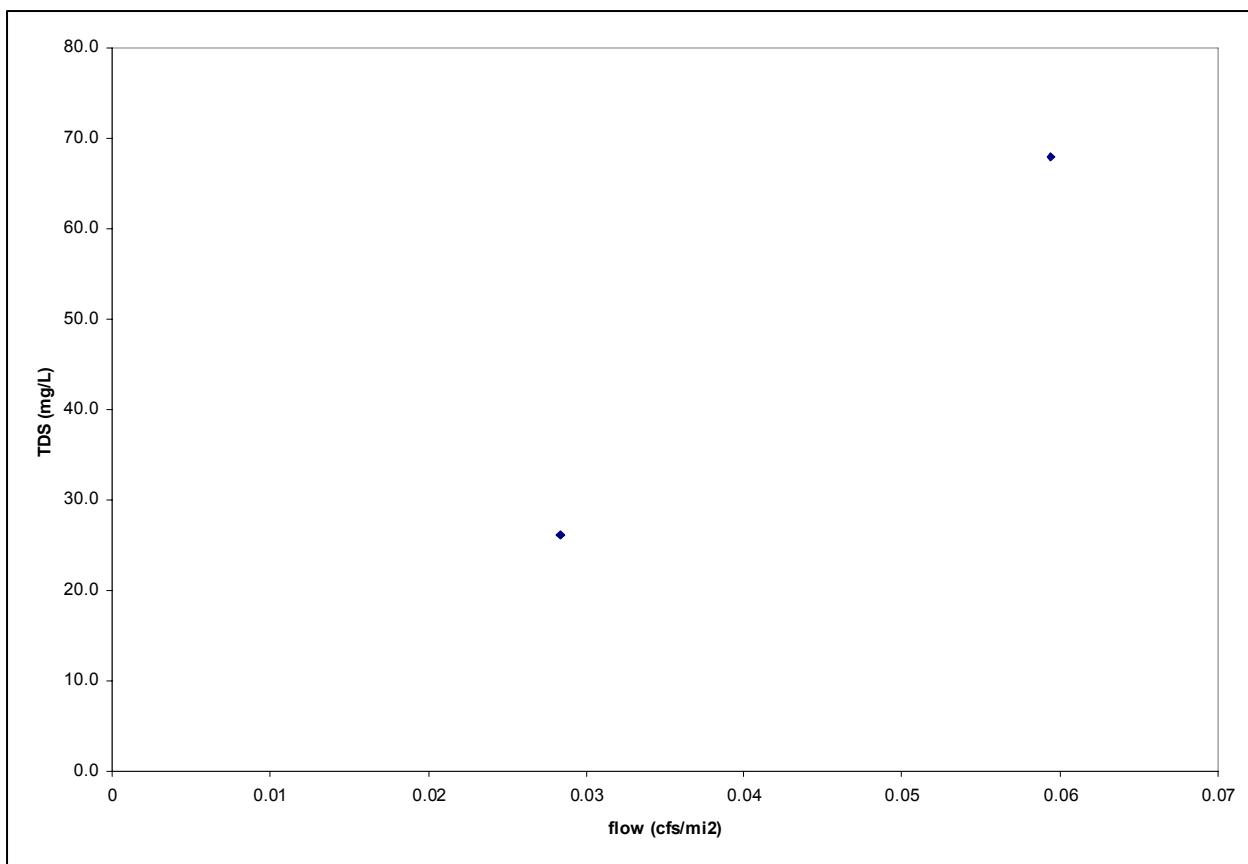


Figure F-27. TDS versus flow at Little Sandy Creek (subsegment 101103) at Kisatchie, Louisiana (station 550).

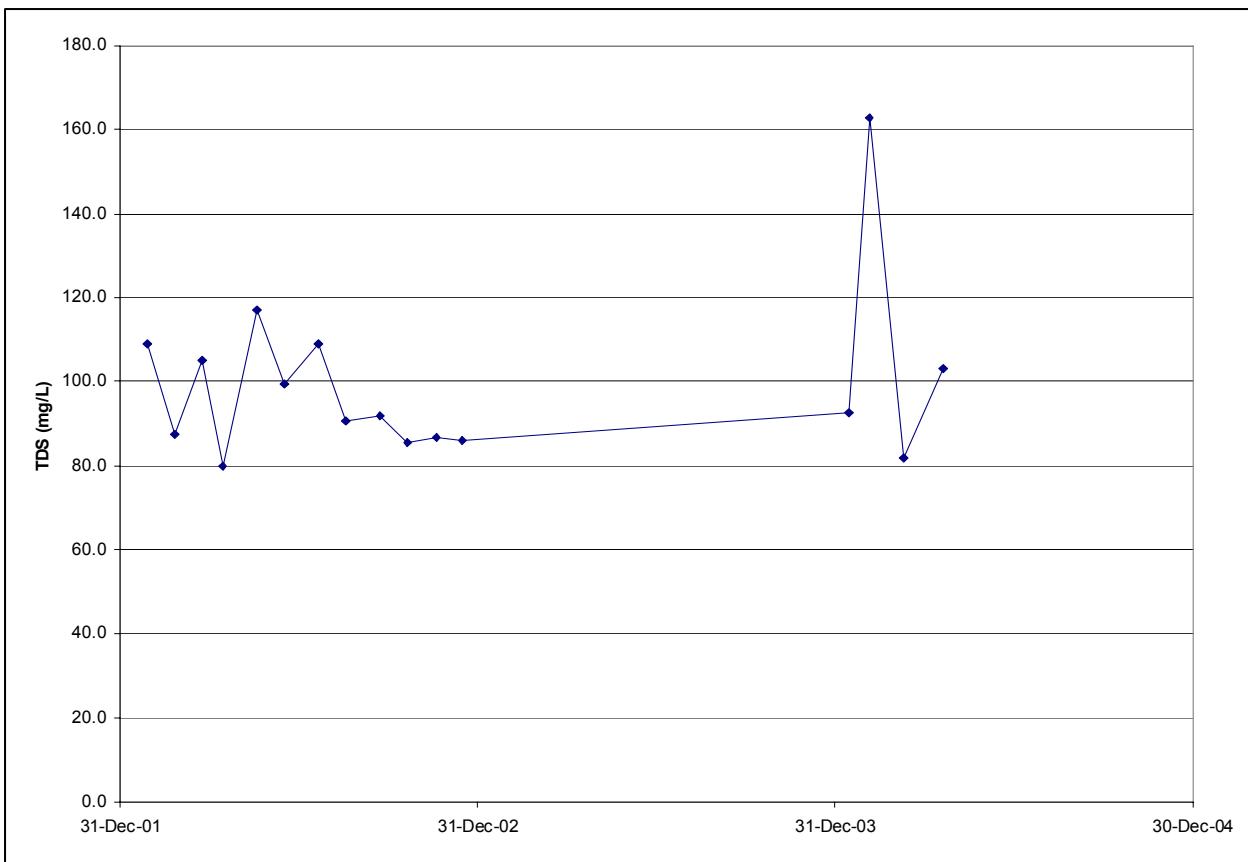


Figure F-28. TDS observations at Kisatchie Bayou (subsegment 101103) south of Cypress, Louisiana (station 1218).

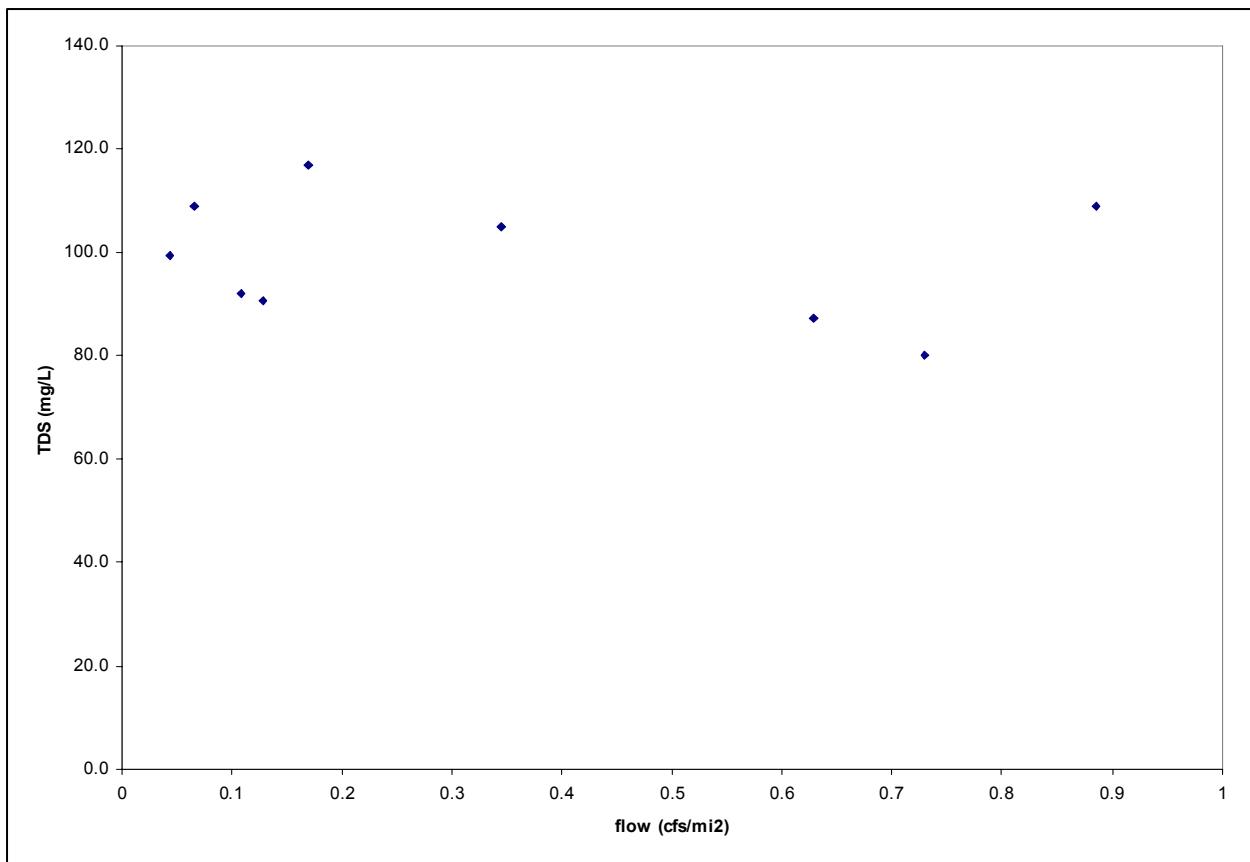


Figure F-29. TDS versus flow at Kisatchie Bayou (subsegment 101103) south of Cypress, Louisiana (station 1218).

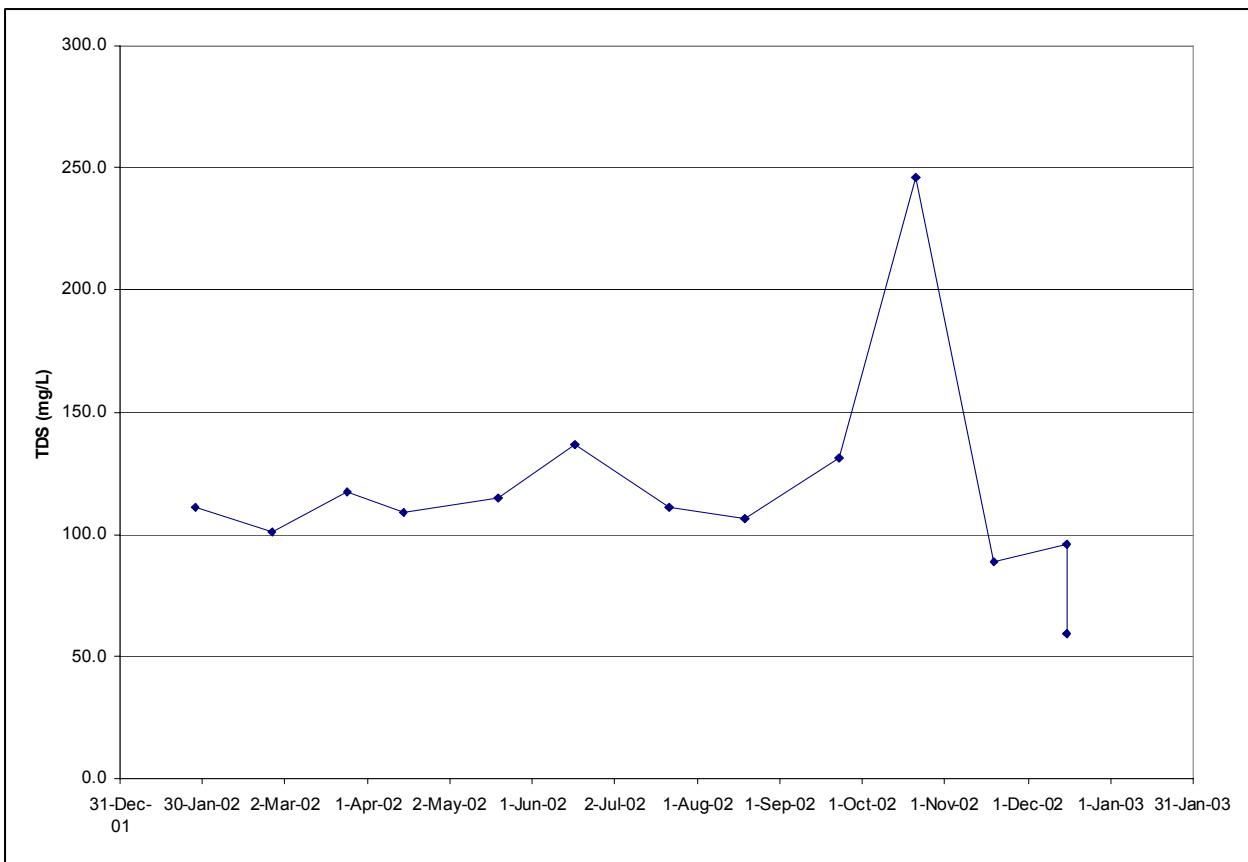


Figure F-30. TDS observations at latt Creek (subsegment 101303) southeast of latt, Louisiana (station 1222).

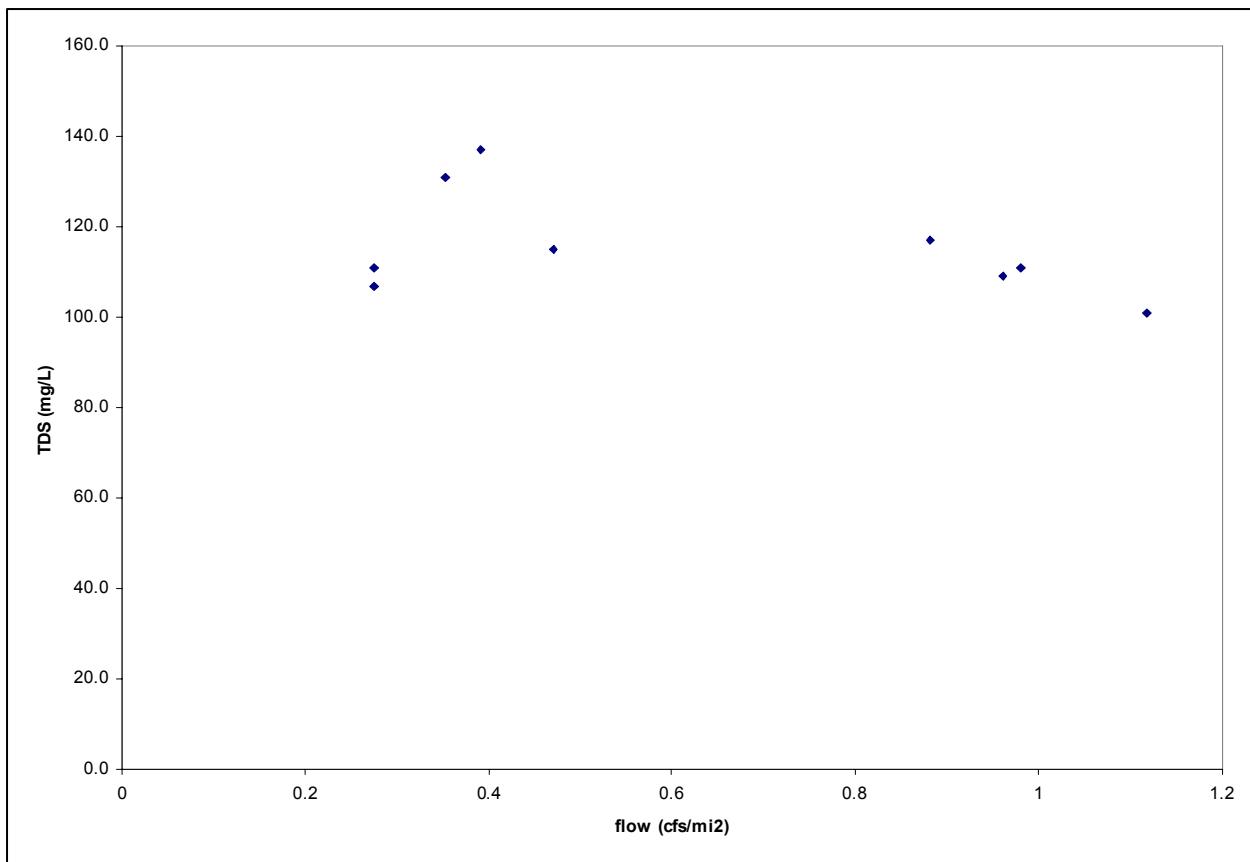


Figure F-31. TDS versus flow at latt Creek (subsegment 101303) southeast of latt, Louisiana (station 1222).

Appendix G

Turbidity Figures for Red River Basin

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Figure G-2. Turbidity versus flow at Buhlow Lake (subsegment 101401) northwest of Pineville, Louisiana (station 1223).	3

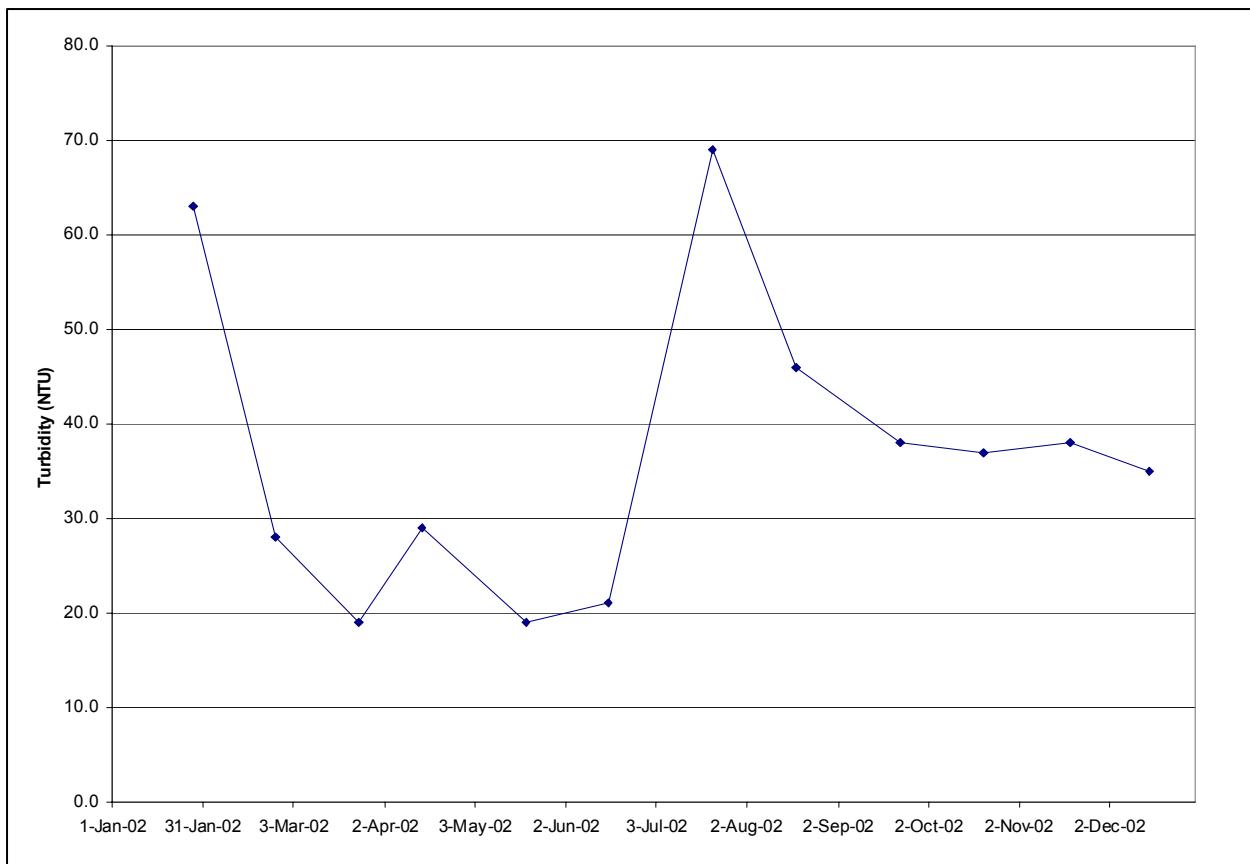


Figure G-1. Turbidity observations at Buhlow Lake (subsegment 101401) northwest of Pineville, Louisiana (station 1223).

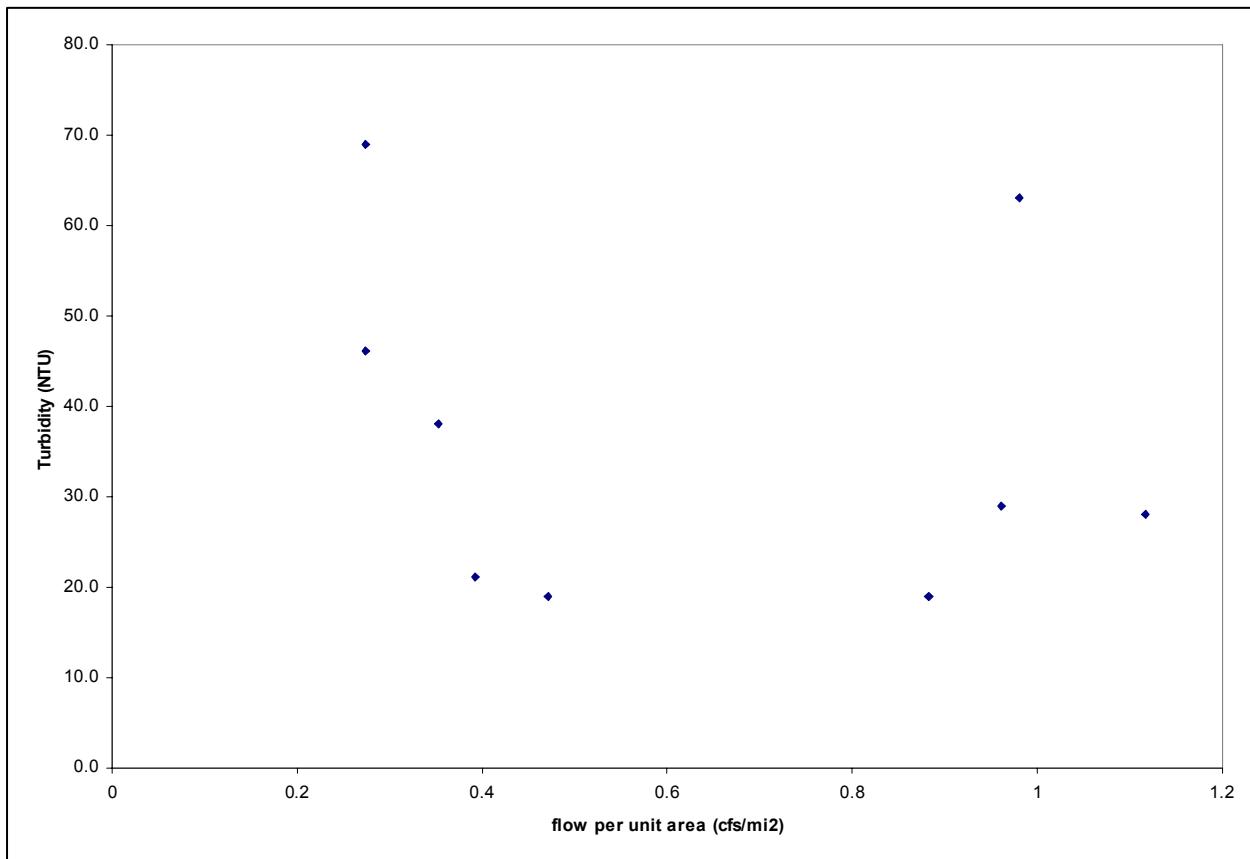


Figure G-2. Turbidity versus flow at Buhlow Lake (subsegment 101401) northwest of Pineville, Louisiana (station 1223).

Appendix H

Load Duration Curve Calculations for All TMDLs

(CD-ROM)

This appendix contains extremely large files, which are included only on a CD-ROM. To obtain a copy of this appendix, please contact EPA.

Appendix I

Load Duration Curve Summaries and Plots for TSS

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Table I-4. Alternative existing load and percent reduction for TSS for Buhlow Lake (subsegment 101401)	6

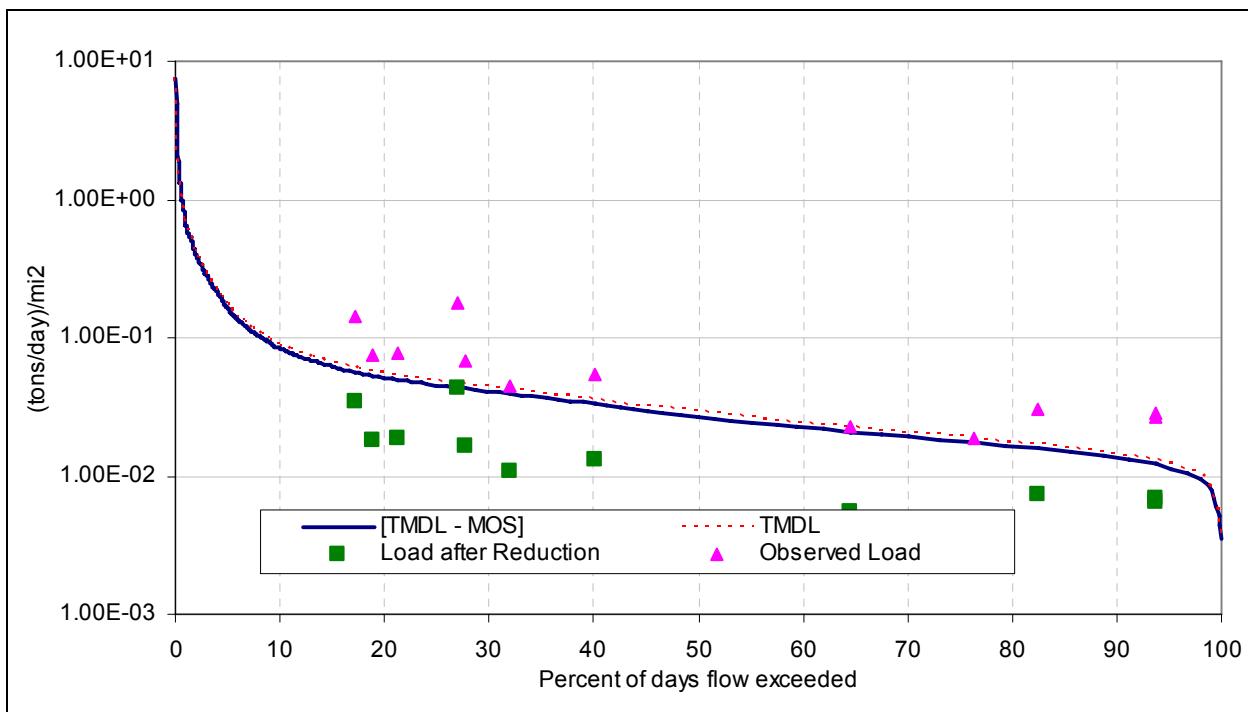


Figure I-1. TSS load duration curve for Buhlow Lake (subsegment 101401) northwest of Pineville, Louisiana (station 1223)

Table I-1. Allowable TSS load for Buhlow Lake (subsegment 101401)

Date	Observed flow (cfs)	Percent exceedance for observed flow	Adjusted flow for entire basin			Width for area under curves (%)	Allowable load to meet standard (tons/day)/mi ²	Target load with MOs incorporated (tons/day)/mi ²	Area under TMDL curve (tons/day/mi ²)
			cfs	cfs/mi ²	cms/mi ²				
8/30/00	4	100.000	0.0356	0.078	0.002	0.00	0.0039	0.0035	6.86E-02
8/31/00	4	100.000	0.0356	0.078	0.002	0.00	0.0039	0.0035	0.00E+00
9/1/00	4	100.000	0.0356	0.078	0.002	0.00	0.0039	0.0035	0.00E+00
9/2/00	4	100.000	0.0356	0.078	0.002	0.00	0.0039	0.0035	0.00E+00
9/3/00	4	100.000	0.0356	0.078	0.002	0.00	0.0039	0.0035	0.00E+00
9/4/00	4	100.000	0.0356	0.078	0.002	0.00	0.0039	0.0035	0.00E+00
9/5/00	4	100.000	0.0356	0.078	0.002	0.00	0.0039	0.0035	0.00E+00
9/6/00	4	100.000	0.0356	0.078	0.002	0.00	0.0039	0.0035	0.00E+00
9/7/00	4	100.000	0.0356	0.078	0.002	0.10	0.0039	0.0035	3.88E-06
8/14/00	5	99.900	0.0445	0.098	0.003	0.00	0.0048	0.0044	0.00E+00
8/15/00	5	99.900	0.0445	0.098	0.003	0.00	0.0048	0.0044	0.00E+00
8/19/00	5	99.900	0.0445	0.098	0.003	0.00	0.0048	0.0044	0.00E+00
6/29/89	3040	0.200	27.0402	59.608	1.688	0.00	2.9476	2.6528	0.00E+00
5/18/89	3330	0.200	29.6197	65.294	1.849	0.00	3.2288	2.9059	0.00E+00
3/2/01	3410	0.200	30.3313	66.863	1.893	0.00	3.3063	2.9757	0.00E+00
11/29/01	3500	0.200	31.1318	68.627	1.943	0.10	3.3936	3.0542	3.39E-03
4/23/95	3760	0.100	33.4445	73.725	2.088	0.00	3.6457	3.2811	0.00E+00
12/27/82	3840	0.100	34.1560	75.294	2.132	0.00	3.7233	3.3509	0.00E+00
4/29/91	3840	0.100	34.1560	75.294	2.132	0.00	3.7233	3.3509	0.00E+00
12/26/82	3890	0.100	34.6008	76.275	2.160	0.00	3.7717	3.3946	0.00E+00
5/19/83	4410	0.100	39.2261	86.471	2.449	0.00	4.2759	3.8483	0.00E+00
2/12/84	4870	0.100	43.3177	95.490	2.704	0.00	4.7219	4.2497	0.00E+00
10/21/84	5390	0.100	47.9430	105.686	2.993	0.00	5.2261	4.7035	0.00E+00
3/7/95	5650	0.100	50.2556	110.784	3.137	0.10	5.4782	4.9304	5.48E-03
11/16/87	8610	0.000	76.5843	168.824	4.781	0.00	8.3482	7.5134	0.00E+00

For brevity most of the cells in this spreadsheet have been hidden.

Table I-2. Existing load and percent reduction for TSS for Buhlow Lake (subsegment 101401)

Date	Observed Concentration (mg/L)	Flow/unit area on sampling day (cms/mi ²)	Percent exceedance for flow on sampling day	Current TSS load (tons/day)/mi ²	Reduced TSS load (tons/day)/mi ²	Allowable load with MOS incorporated (tons/day)/mi ²	Reduced load less than or equal to allow load?
1/28/02	68	0.027761765	27	1.797E-01	4.363E-02	4.363E-02	Yes
10/21/02	41.6	0.036090294	17.1	1.429E-01	3.470E-02	5.672E-02	Yes
7/22/02	39	0.007773294	93.7	2.885E-02	7.007E-03	1.222E-02	Yes
8/19/02	36	0.007773294	93.7	2.663E-02	6.468E-03	1.222E-02	Yes
9/23/02	32	0.009994235	82.4	3.044E-02	7.392E-03	1.571E-02	Yes
11/19/02	27	0.021098941	40.1	5.422E-02	1.317E-02	3.316E-02	Yes
4/15/02	26.6	0.027206529	27.8	6.888E-02	1.673E-02	4.276E-02	Yes
2/25/02	26	0.031648412	21.3	7.831E-02	1.902E-02	4.974E-02	Yes
12/16/02	23	0.033869353	18.9	7.414E-02	1.800E-02	5.323E-02	Yes
3/25/02	18.6	0.024985588	32	4.423E-02	1.074E-02	3.927E-02	Yes
5/20/02	18	0.01325647	64.6	2.283E-02	5.544E-03	2.094E-02	Yes
6/17/02	18	0.011104706	76.4	1.902E-02	4.620E-03	1.745E-02	Yes

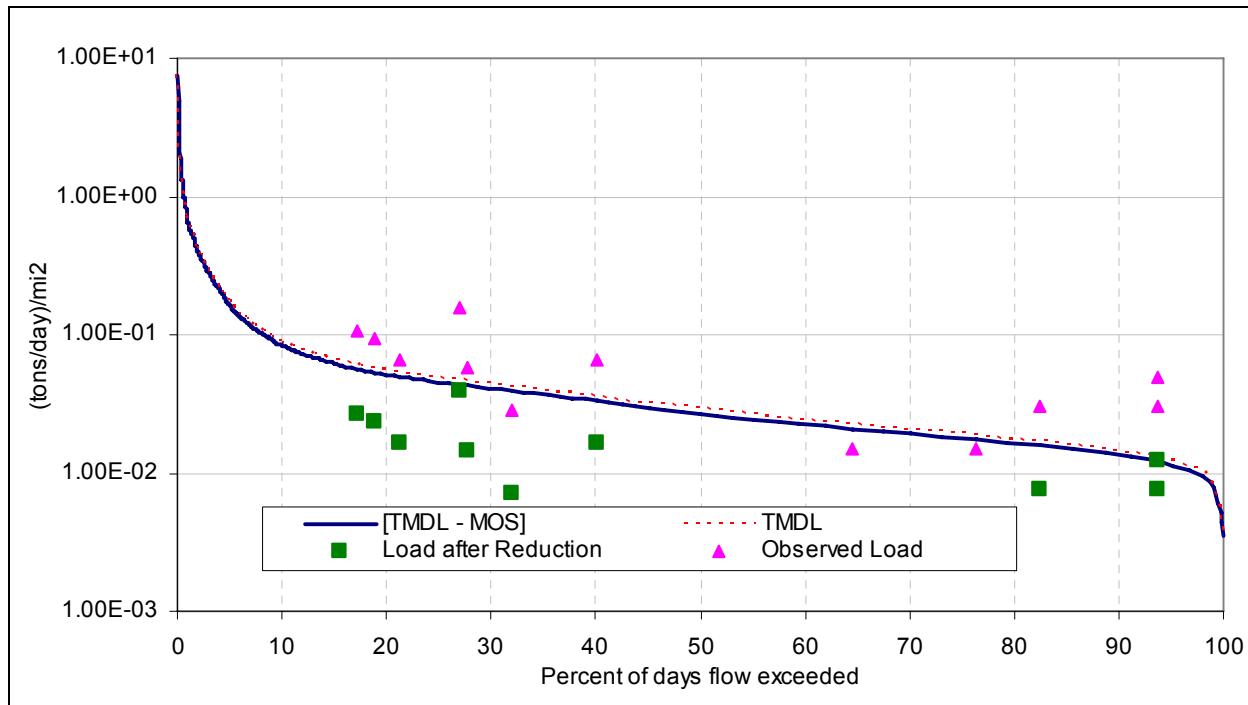
**Figure I-2. Alternative TSS load duration curve for Buhlow Lake (subsegment 101401) northwest of Pineville, Louisiana (station 1223)**

Table I-3. Alternative allowable TSS load for Buhlow Lake (subsegment 101401)

Date	Observed flow (cfs)	Percent exceedance for observed flow	Adjusted flow for entire basin			Width for area under curves (%)	Allowable load to meet standard (tons/day)/mi ²	Target load with MOS incorporated (tons/day)/mi ²	Area under TMDL curve (tonsdays/mi ²)
			cfs	cfs/mi ²	cms/mi ²				
8/30/00	4	100.000	0.0356	0.078	0.002	0.00	0.0039	0.0035	0.00E+00
8/31/00	4	100.000	0.0356	0.078	0.002	0.00	0.0039	0.0035	0.00E+00
9/1/00	4	100.000	0.0356	0.078	0.002	0.00	0.0039	0.0035	0.00E+00
9/2/00	4	100.000	0.0356	0.078	0.002	0.00	0.0039	0.0035	0.00E+00
9/3/00	4	100.000	0.0356	0.078	0.002	0.00	0.0039	0.0035	0.00E+00
9/4/00	4	100.000	0.0356	0.078	0.002	0.00	0.0039	0.0035	0.00E+00
9/5/00	4	100.000	0.0356	0.078	0.002	0.00	0.0039	0.0035	0.00E+00
9/6/00	4	100.000	0.0356	0.078	0.002	0.00	0.0039	0.0035	0.00E+00
9/7/00	4	100.000	0.0356	0.078	0.002	0.10	0.0039	0.0035	3.88E-06
8/14/00	5	99.900	0.0445	0.098	0.003	0.00	0.0048	0.0044	0.00E+00
8/15/00	5	99.900	0.0445	0.098	0.003	0.00	0.0048	0.0044	0.00E+00
8/19/00	5	99.900	0.0445	0.098	0.003	0.00	0.0048	0.0044	0.00E+00
6/29/89	3040	0.200	27.0402	59.608	1.688	0.00	2.9476	2.6528	0.00E+00
5/18/89	3330	0.200	29.6197	65.294	1.849	0.00	3.2288	2.9059	0.00E+00
3/2/01	3410	0.200	30.3313	66.863	1.893	0.00	3.3063	2.9757	0.00E+00
11/29/01	3500	0.200	31.1318	68.627	1.943	0.10	3.3936	3.0542	3.39E-03
4/23/95	3760	0.100	33.4445	73.725	2.088	0.00	3.6457	3.2811	0.00E+00
12/27/82	3840	0.100	34.1560	75.294	2.132	0.00	3.7233	3.3509	0.00E+00
4/29/91	3840	0.100	34.1560	75.294	2.132	0.00	3.7233	3.3509	0.00E+00
12/26/82	3890	0.100	34.6008	76.275	2.160	0.00	3.7717	3.3946	0.00E+00
5/19/83	4410	0.100	39.2261	86.471	2.449	0.00	4.2759	3.8483	0.00E+00
2/12/84	4870	0.100	43.3177	95.490	2.704	0.00	4.7219	4.2497	0.00E+00
10/21/84	5390	0.100	47.9430	105.686	2.993	0.00	5.2261	4.7035	0.00E+00
3/7/95	5650	0.100	50.2556	110.784	3.137	0.10	5.4782	4.9304	5.48E-03
11/16/87	8610	0.000	76.5843	168.824	4.781	0.00	8.3482	7.5134	0.00E+00

For brevity most of the cells in this spreadsheet have been hidden.

Table I-4. Alternative existing load and percent reduction for TSS for Buhlow Lake (subsegment 101401)

Date	Observed Concentration (mg/L)	Flow/unit area on sampling day (cms/mi ²)	Percent exceedance for flow on sampling day	Current TSS load (tons/day)/mi ²	Reduced TSS load (tons/day)/mi ²	Allowable load with MOS incorporated (tons/day)/mi ²	Reduced load less than or equal to allow load?
7/22/02	66.0	0.007773294	93.7	4.879E-02	1.222E-02	1.222E-02	Yes
1/28/02	59.5	0.027761765	27.0	1.571E-01	3.934E-02	4.363E-02	Yes
8/19/02	41.1	0.007773294	93.7	3.038E-02	7.607E-03	1.222E-02	Yes
9/23/02	32.4	0.009994235	82.4	3.083E-02	7.720E-03	1.571E-02	Yes
11/19/02	32.4	0.021098941	40.1	6.509E-02	1.630E-02	3.316E-02	Yes
10/21/02	31.3	0.036090294	17.1	1.076E-01	2.695E-02	5.672E-02	Yes
12/16/02	29.2	0.033869353	18.9	9.402E-02	2.354E-02	5.323E-02	Yes
4/15/02	22.7	0.027206529	27.8	5.872E-02	1.470E-02	4.276E-02	Yes
2/25/02	21.6	0.031648412	21.3	6.504E-02	1.629E-02	4.974E-02	Yes
6/17/02	14.0	0.011104706	76.4	1.482E-02	3.710E-03	1.745E-02	Yes
3/25/02	11.9	0.024985588	32.0	2.820E-02	7.060E-03	3.927E-02	Yes
5/20/02	11.9	0.013325647	64.6	1.504E-02	3.765E-03	2.094E-02	Yes

Appendix J

Load Duration Curve Summaries and Plots for Chloride

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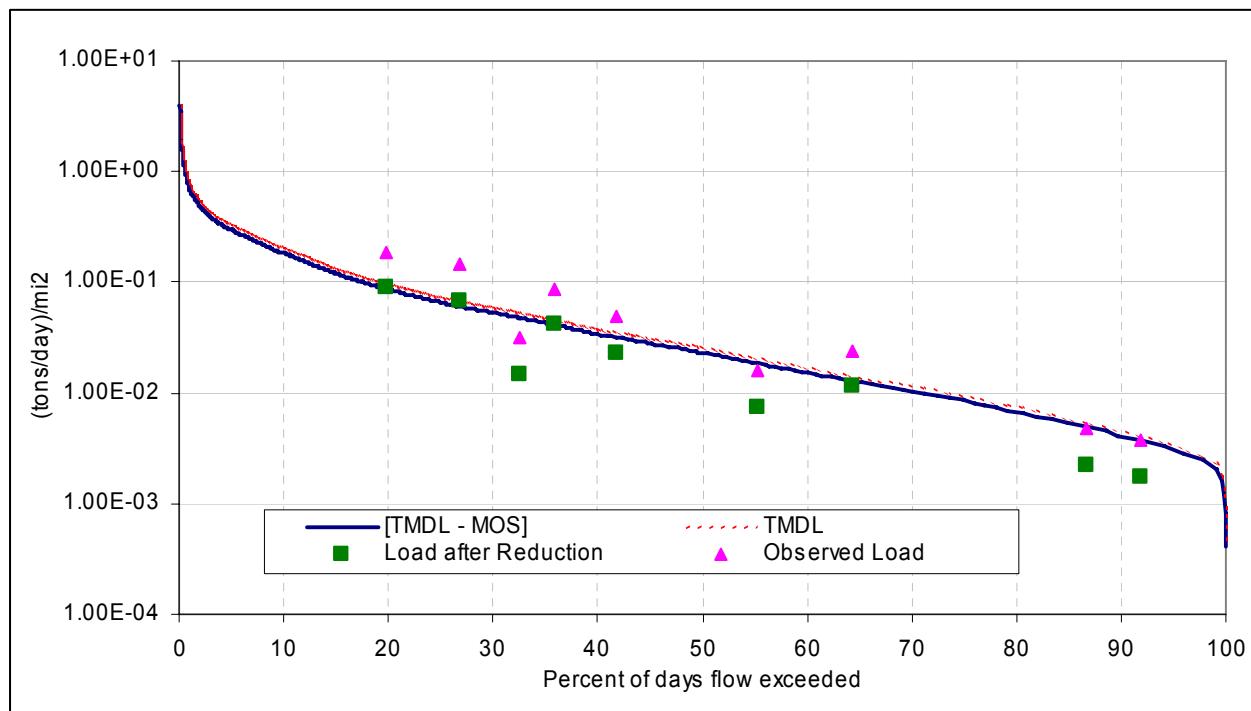


Figure J-1. Chloride load duration curve for unnamed tributary of Grand Bayou (subsegment 100710) near Hall Summit, Louisiana (station 1195)

Table J-1. Allowable chloride load for unnamed tributary of Grand Bayou (subsegment 100710)

Date	Observed flow (cfs)	Percent exceedance for observed flow	Adjusted flow for entire basin			Width for area under curves (%)	Allowable load to meet standard (tons/day)/mi ²	Target load with MOS incorporated (tons/day)/mi ²	Area under TMDL curve (tons/day/mi ²)
			cfs	cfs*	cfs/mi ²				
8/31/00	1	100,000	0.0005	0.0778	1.085	0.031	0.00	0.0760	0.0684
9/1/00	1	100,000	0.0005	0.0778	1.085	0.031	0.00	0.0760	0.0684
9/6/00	1	100,000	0.0005	0.0778	1.085	0.031	0.00	0.0760	0.0684
8/14/00	2	100,000	0.0009	0.0783	1.091	0.031	0.00	0.0764	0.0688
8/15/00	2	100,000	0.0009	0.0783	1.091	0.031	0.00	0.0764	0.0688
8/16/00	2	100,000	0.0009	0.0783	1.091	0.031	0.00	0.0764	0.0688
8/17/00	2	100,000	0.0009	0.0783	1.091	0.031	0.00	0.0764	0.0688
8/21/00	2	100,000	0.0009	0.0783	1.091	0.031	0.00	0.0764	0.0688
8/22/00	2	100,000	0.0009	0.0783	1.091	0.031	0.00	0.0764	0.0688
8/28/00	2	100,000	0.0009	0.0783	1.091	0.031	0.00	0.0764	0.0688
8/29/00	2	100,000	0.0009	0.0783	1.091	0.031	0.00	0.0764	0.0688
8/30/00	2	100,000	0.0009	0.0783	1.091	0.031	0.00	0.0764	0.0688
								0.0688	0.0688
6/30/89	5930	0.100	2.7633	2.8406	39.585	1.121	0.00	2.7737	2.4963
3/8/95	5950	0.100	2.7726	2.8499	39.714	1.125	0.00	2.7828	2.5045
7/2/89	6040	0.100	2.8145	2.8919	40.299	1.141	0.00	2.8238	2.5414
5/6/89	6060	0.100	2.8238	2.9012	40.429	1.145	0.00	2.8329	2.5496
7/1/89	6200	0.100	2.8891	2.9664	41.338	1.171	0.00	2.8966	2.6069
1/31/99	6370	0.100	2.9683	3.0457	42.442	1.202	0.00	2.9739	2.6765
4/3/91	6420	0.100	2.9916	3.0690	42.766	1.211	0.00	2.9967	2.6970
2/20/91	6660	0.100	3.1034	3.1808	44.325	1.255	0.00	3.1059	2.7953
12/28/82	6720	0.100	3.1314	3.2088	44.714	1.266	0.00	3.1332	2.8198
12/13/01	6970	0.100	3.2479	3.3252	46.338	1.312	0.00	3.2469	2.9222
5/19/89	8050	0.100	3.7511	3.8285	53.351	1.511	0.00	3.7383	3.3645
1/30/99	8590	0.100	4.0028	4.0801	56.857	1.610	0.10	3.9840	3.5856
4/23/95	9730	0.000	4.5340	4.6114	64.260	1.820	0.00	4.5027	4.0524

For brevity most of the cells in this spreadsheet have been hidden.

* Flow was adjusted to include WTP flow as watershed was too small.

Table J-2. Existing chloride load and percent reduction for unnamed tributary of Grand Bayou (subsegment 100710)

Date	Observed Concentration (mg/L)	Flow/unit area on sampling day (cms/mi ²)	Percent exceedance for flow on sampling day	Current Chloride load (tons/day)/mi ²	Reduced Chloride load (tons/day)/mi ²	Allowable load with MOS incorporated (tons/day)/mi ²	Reduced load less than or equal to allow load?
2/19/02	57	0.027029864	26.8	1.474E-01	6.020E-02	6.020E-02	Yes
3/19/02	50	0.039533474	19.7	1.881E-01	7.683E-02	8.804E-02	Yes
1/15/02	50	0.018571539	35.8	8.785E-02	3.587E-02	4.136E-02	Yes
5/14/02	45	0.005700175	64.4	2.414E-02	9.859E-03	1.269E-02	Yes
12/10/02	36	0.014342377	41.7	4.928E-02	2.012E-02	3.194E-02	Yes
8/5/02	24	0.001654890	91.8	3.764E-03	1.537E-03	3.686E-03	Yes
7/9/02	23	0.002206519	86.6	4.767E-03	1.947E-03	4.914E-03	Yes
11/19/02	20	0.008274448	55.3	1.607E-02	6.561E-03	1.843E-02	Yes
6/11/02	16	0.021329688	32.6	3.167E-02	1.293E-02	4.750E-02	Yes

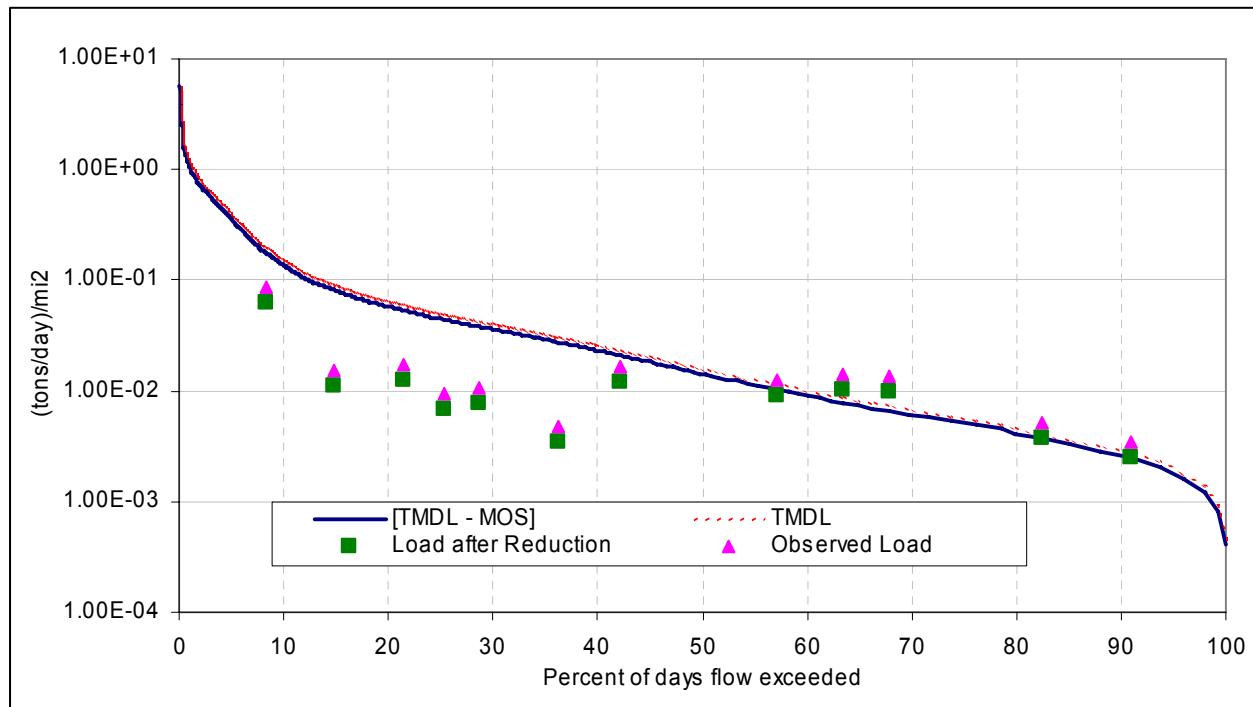
**Figure J-2. Chloride load duration curve for Cane River (subsegment 101101) west of Colfax, Louisiana (station 1217)**

Table J-3. Allowable chloride load for Cane River (subsegment 101101)

Date	Observed flow (cfs)	Percent exceedance for observed flow	Adjusted flow for entire basin			Width for area under curves (%)	Allowable load to meet standard (tons/day)/mi ²	Target load with MOS incorporated (tons/day)/mi ²	Area under TMDL curve (tons/day/mi ²)
			cfs	cfs/mi ²	cms/mi ²				
7/12/98	1	100.000	0.2110	0.007	0.000	0.00	0.0005	0.0004	8.38E-02
7/13/98	1	100.000	0.2110	0.007	0.000	0.00	0.0005	0.0004	0.00E+00
7/14/98	1	100.000	0.2110	0.007	0.000	0.00	0.0005	0.0004	0.00E+00
7/23/98	1	100.000	0.2110	0.007	0.000	0.00	0.0005	0.0004	0.00E+00
7/24/98	1	100.000	0.2110	0.007	0.000	0.00	0.0005	0.0004	0.00E+00
7/25/98	1	100.000	0.2110	0.007	0.000	0.00	0.0005	0.0004	0.00E+00
7/27/98	1	100.000	0.2110	0.007	0.000	0.00	0.0005	0.0004	0.00E+00
7/29/98	1	100.000	0.2110	0.007	0.000	0.00	0.0005	0.0004	0.00E+00
7/30/98	1	100.000	0.2110	0.007	0.000	0.00	0.0005	0.0004	0.00E+00
7/31/98	1	100.000	0.2110	0.007	0.000	0.00	0.0005	0.0004	0.00E+00
8/1/98	1	100.000	0.2110	0.007	0.000	0.00	0.0005	0.0004	0.00E+00
8/2/98	1	100.000	0.2110	0.007	0.000	0.00	0.0005	0.0004	0.00E+00
11/15/98	6580	0.200	1388.0723	44.459	1.259	0.00	2.9955	2.6959	0.00E+00
7/1/99	6640	0.200	1400.7295	44.865	1.270	0.00	3.0228	2.7205	0.00E+00
1/14/99	6860	0.200	1447.1392	46.351	1.313	0.00	3.1229	2.8106	0.00E+00
5/19/99	7130	0.200	1504.0966	48.176	1.364	0.00	3.2459	2.9213	0.00E+00
12/27/98	7540	0.200	1590.5875	50.946	1.443	0.10	3.4325	3.0893	3.43E-03
11/29/01	7840	0.100	1653.8734	52.973	1.500	0.00	3.5691	3.2122	0.00E+00
1/7/98	8610	0.100	1816.3074	58.176	1.647	0.00	3.9196	3.5276	0.00E+00
5/21/93	9070	0.100	1913.3459	61.284	1.735	0.00	4.1290	3.7161	0.00E+00
6/29/99	9670	0.100	2039.9179	65.338	1.850	0.00	4.4022	3.9619	0.00E+00
12/28/92	10200	0.100	2151.7231	68.919	1.952	0.00	4.6434	4.1791	0.00E+00
7/29/99	10700	0.100	2257.1997	72.297	2.047	0.00	4.8711	4.3840	0.00E+00
6/28/89	12100	0.100	2552.5342	81.757	2.315	0.10	5.5084	4.9576	5.51E-03
1/30/99	13900	0.000	2932.2501	93.919	2.660	0.00	6.3278	5.6950	0.00E+00

For brevity most of the cells in this spreadsheet have been hidden.

Table J-4. Existing chloride load and percent reduction for Cane River (subsegment 101101)

Date	Observed Concentration (mg/L)	Flow/unit area on sampling day (cms/mi ²)	Percent exceedance for flow on sampling day	Current Chloride load (tons/day)/mi ²	Reduced Chloride load (tons/day)/mi ²	Allowable load with MOS incorporated (tons/day)/mi ²	Reduced load less than or equal to allow load?
9/23/02	47	0.003061297	67.9	1.364E-02	6.555E-03	6.555E-03	Yes
8/19/02	40	0.003635291	63.4	1.387E-02	6.670E-03	7.785E-03	Yes
6/17/02	31	0.001147986	91.0	3.420E-03	1.644E-03	2.458E-03	Yes
7/22/02	31	0.001721980	82.5	5.080E-03	2.443E-03	3.687E-03	Yes
5/20/02	27	0.004783277	57.2	1.238E-02	5.953E-03	1.024E-02	Yes
3/25/02	18	0.009757885	42.1	1.644E-02	7.903E-03	2.090E-02	Yes
10/21/02	11	0.081889703	8.4	8.495E-02	4.084E-02	1.754E-01	Yes
1/28/02	7	0.025064372	21.5	1.741E-02	8.372E-03	5.367E-02	Yes
2/25/02	6	0.017793791	28.6	1.084E-02	5.211E-03	3.810E-02	Yes
4/15/02	5	0.020663757	25.3	9.636E-03	4.633E-03	4.425E-02	Yes
12/16/02	4	0.038074885	14.8	1.522E-02	7.317E-03	8.153E-02	Yes
11/19/02	4	0.012819182	36.2	4.758E-03	2.288E-03	2.745E-02	Yes

Appendix K

Load Duration Curve Summaries and Plots for Total Dissolved Solids

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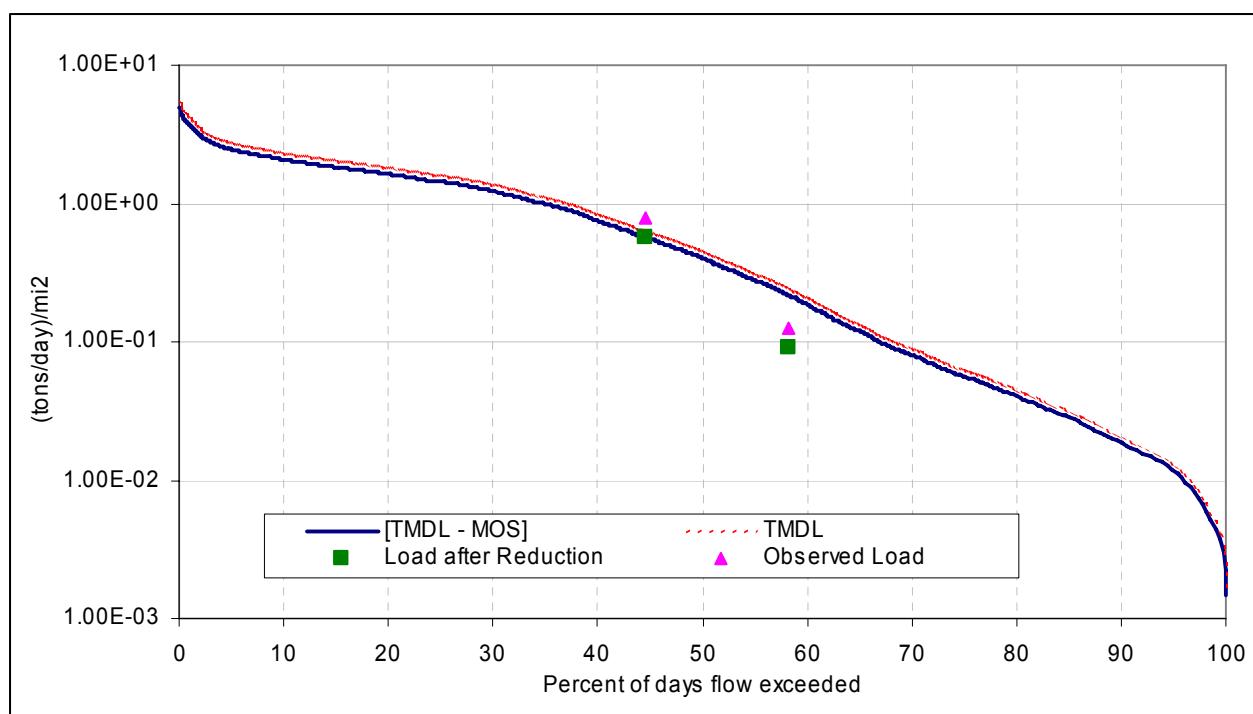


Figure K-1. TDS load duration curve for Flat River Drainage Canal (subsegment 100406) north of Bossier City, Louisiana (station 363).

Table K-1. Allowable TDS load for Flat River Drainage Canal (subsegment 100406) north of Bossier City, Louisiana (station 363)

Date	Observed flow (cfs)	Percent exceedance for observed flow	Adjusted flow for entire basin			Width for area under curves (%)	Allowable load to meet standard (tons/day)/mi ²	Target load with MOS incorporated (tons/day)/mi ²	Area under TMDL curve (tons/day/mi ²)
			cfs	cfs/mi ²	cms/mi ²				8.89E-01
10/4/82	2	100.000	0.02233	0.002	0.000	0.00	0.0017	0.0015	0.00E+00
10/5/82	2	100.000	0.02233	0.002	0.000	0.00	0.0017	0.0015	0.00E+00
10/6/82	2	100.000	0.02233	0.002	0.000	0.00	0.0017	0.0015	0.00E+00
9/18/82	3	100.000	0.0334	0.003	0.000	0.00	0.0025	0.0022	0.00E+00
9/19/82	3	100.000	0.0334	0.003	0.000	0.00	0.0025	0.0022	0.00E+00
10/1/82	3	100.000	0.0334	0.003	0.000	0.00	0.0025	0.0022	0.00E+00
10/2/82	3	100.000	0.0334	0.003	0.000	0.00	0.0025	0.0022	0.00E+00
10/3/82	3	100.000	0.0334	0.003	0.000	0.00	0.0025	0.0022	0.00E+00
9/24/87	3	100.000	0.0334	0.003	0.000	0.00	0.0025	0.0022	0.00E+00
9/25/87	3	100.000	0.0334	0.003	0.000	0.00	0.0025	0.0022	0.00E+00
9/26/87	3	100.000	0.0334	0.003	0.000	0.00	0.0025	0.0022	0.00E+00
9/27/87	3	100.000	0.0334	0.003	0.000	0.10	0.0025	0.0022	2.48E-06

For brevity most of the cells in this spreadsheet have been hidden.

4/10/97	5820	0.200	64.7758	5.939	0.168	0.00	4.8015	4.3214	0.00E+00
5/3/97	5820	0.200	64.7758	5.939	0.168	0.00	4.8015	4.3214	0.00E+00
5/15/97	5820	0.200	64.7758	5.939	0.168	0.00	4.8015	4.3214	0.00E+00
5/14/91	5870	0.200	65.3323	5.990	0.170	0.00	4.8428	4.3585	0.00E+00
5/16/91	5890	0.200	65.5549	6.010	0.170	0.00	4.8593	4.3733	0.00E+00
4/9/97	5900	0.200	65.6662	6.020	0.170	0.00	4.8675	4.3808	0.00E+00
5/4/97	5910	0.200	65.7775	6.031	0.171	0.10	4.8758	4.3882	4.88E-03
5/15/91	5970	0.100	66.4453	6.092	0.173	0.00	4.9253	4.4327	0.00E+00
4/8/97	6020	0.100	67.0018	6.143	0.174	0.00	4.9665	4.4699	0.00E+00
4/16/91	6130	0.100	68.2261	6.255	0.177	0.00	5.0573	4.5516	0.00E+00
4/7/97	6190	0.100	68.8939	6.316	0.179	0.00	5.1068	4.5961	0.00E+00
4/6/97	6370	0.100	70.8973	6.500	0.184	0.00	5.2553	4.7298	0.00E+00
4/13/91	6500	0.100	72.3441	6.633	0.188	0.00	5.3625	4.8263	0.00E+00
4/14/91	6620	0.100	73.6797	6.755	0.191	0.10	5.4615	4.9154	5.46E-03
4/15/91	6630	0.000	73.7910	6.765	0.192	0.00	5.4698	4.9228	0.00E+00

Table K-2. Existing TDS load and percent reduction for Flat River Drainage Canal (subsegment 100406) north of Bossier City, Louisiana (station 363)

Date	Observed Concentration (mg/L)	Flow/unit area on sampling day (cms/mi ²)	Percent exceedance for flow on sampling day	Current TDS load (tons/day)/mi ²	Reduced TDS load (tons/day)/mi ²	Allowable load with MOS incorporated (tons/day)/mi ²	Reduced load less than or equal to allow load?
8/13/91	754	0.001242481	83.2	8.916E-02	3.193E-02	3.193E-02	Yes
10/15/96	654	0.008957418	57.5	5.575E-01	1.996E-01	2.302E-01	Yes
10/14/91	624	0.007946097	59.0	4.719E-01	1.690E-01	2.042E-01	Yes
6/12/95	610	0.003236229	69.4	1.879E-01	6.728E-02	8.316E-02	Yes
8/14/90	550	0.001675904	79.1	8.773E-02	3.141E-02	4.307E-02	Yes
10/16/90	547	0.000462318	94.9	2.407E-02	8.619E-03	1.188E-02	Yes
8/11/92	534	0.001704799	78.8	8.664E-02	3.103E-02	4.381E-02	Yes
12/10/90	532	0.022422441	44.2	1.135E+00	4.065E-01	5.762E-01	Yes
6/9/97	532	0.065591418	18.8	3.321E+00	1.189E+00	1.685E+00	Yes
5/14/02	528	0.054322408	26.2	2.730E+00	9.775E-01	1.396E+00	Yes
8/5/02	520	0.000520108	93.9	2.574E-02	9.217E-03	1.337E-02	Yes
8/15/95	518	0.000577898	92.8	2.849E-02	1.020E-02	1.485E-02	Yes
4/4/95	516	0.042764449	32.7	2.100E+00	7.520E-01	1.099E+00	Yes
9/17/02	498	0.001647009	79.5	7.806E-02	2.795E-02	4.232E-02	Yes
2/14/95	488	0.068191959	17.1	3.167E+00	1.134E+00	1.752E+00	Yes
2/4/91	450	0.077149378	11.7	3.304E+00	1.183E+00	1.982E+00	Yes
4/14/98	450	0.060968235	21.6	2.611E+00	9.350E-01	1.567E+00	Yes
2/19/02	446	0.047098684	30.5	1.999E+00	7.159E-01	1.210E+00	Yes
7/9/02	440	0.001733694	78.6	7.260E-02	2.600E-02	4.455E-02	Yes
4/6/92	438	0.080038867	10.3	3.336E+00	1.195E+00	2.057E+00	Yes
2/8/94	438	0.038719163	35.0	1.614E+00	5.780E-01	9.950E-01	Yes
6/15/92	412	0.026438832	41.7	1.037E+00	3.712E-01	6.794E-01	Yes
10/15/02	412	0.004680973	65.0	1.835E-01	6.573E-02	1.203E-01	Yes
11/18/02	394	0.002427171	73.4	9.101E-02	3.259E-02	6.237E-02	Yes
4/12/94	392	0.041319704	33.3	1.542E+00	5.520E-01	1.062E+00	Yes
2/10/92	366	0.052877663	27.1	1.842E+00	6.596E-01	1.359E+00	Yes
1/15/02	364	0.072237245	14.4	2.503E+00	8.961E-01	1.856E+00	Yes
6/13/94	358	0.030050694	39.5	1.024E+00	3.666E-01	7.722E-01	Yes
12/10/02	358	0.004796553	64.6	1.634E-01	5.852E-02	1.233E-01	Yes
10/11/94	356	0.003756337	67.3	1.273E-01	4.557E-02	9.653E-02	Yes
10/11/93	346	0.001531430	80.4	5.043E-02	1.806E-02	3.935E-02	Yes
3/19/02	346	0.038719163	35.0	1.275E+00	4.566E-01	9.950E-01	Yes
6/11/02	308	0.035829673	36.7	1.050E+00	3.761E-01	9.207E-01	Yes
6/11/90	299	0.066458265	18.3	1.891E+00	6.772E-01	1.708E+00	Yes
12/9/97	298	0.015140927	50.5	4.294E-01	1.538E-01	3.891E-01	Yes
12/14/93	296	0.009015208	57.4	2.540E-01	9.094E-02	2.317E-01	Yes
8/12/97	290	0.001589219	80.0	4.386E-02	1.571E-02	4.084E-02	Yes
12/10/91	262	0.064146673	19.7	1.600E+00	5.728E-01	1.648E+00	Yes
2/12/90	242	0.092752622	5.8	2.136E+00	7.650E-01	2.383E+00	Yes
12/9/96	228	0.054611357	26.1	1.185E+00	4.243E-01	1.403E+00	Yes
4/9/90	222	0.103154786	3.6	2.179E+00	7.805E-01	2.651E+00	Yes
12/13/94	208	0.029183847	40.0	5.777E-01	2.069E-01	7.499E-01	Yes
6/11/91	170	0.072237245	14.4	1.169E+00	4.185E-01	1.856E+00	Yes
2/18/97	170	0.105755327	3.3	1.711E+00	6.127E-01	2.718E+00	Yes
10/14/97	170	0.001358060	82.1	2.197E-02	7.868E-03	3.490E-02	Yes
4/15/97	150	0.154298755	0.7	2.203E+00	7.888E-01	3.965E+00	Yes
4/9/02	135	0.113268000	2.4	1.455E+00	5.211E-01	2.911E+00	Yes
8/8/94	132	0.003409598	68.7	4.283E-02	1.534E-02	8.762E-02	Yes
4/16/91	124	0.177125724	0.1	2.090E+00	7.485E-01	4.552E+00	Yes

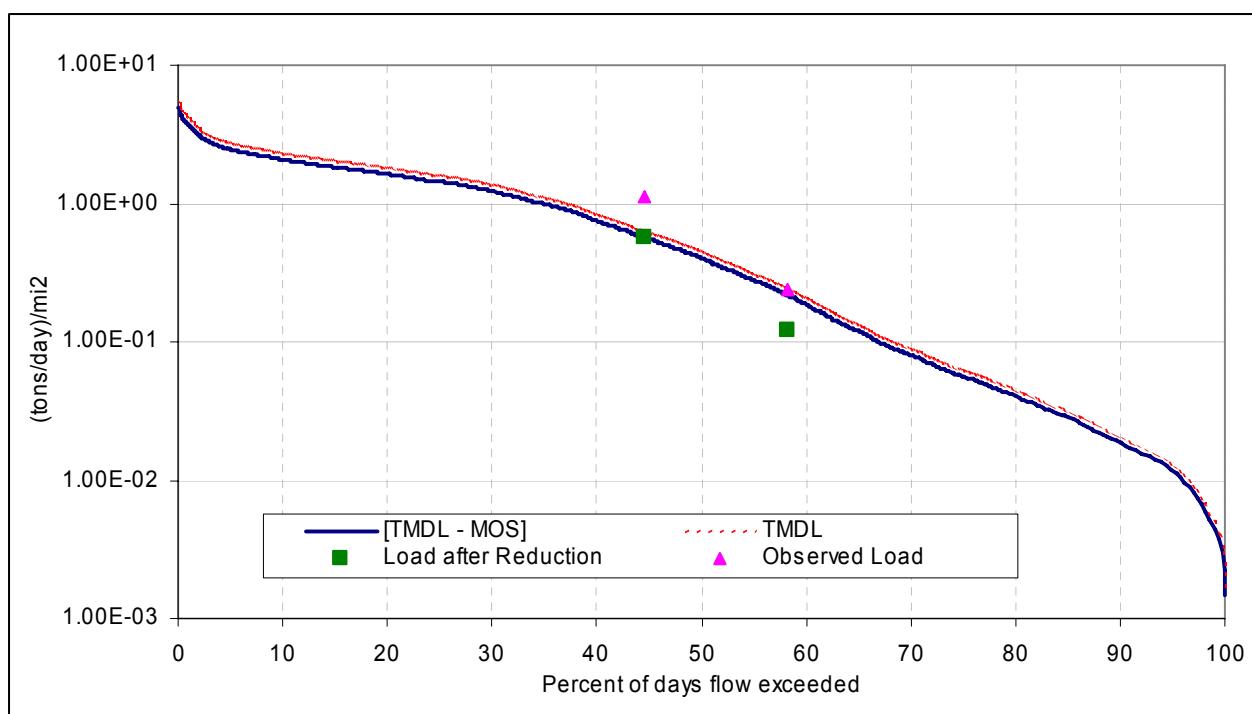


Figure K-2. TDS load duration curve for Flat River Drainage Canal (subsegment 100406) northeast of Bossier City, Louisiana (station 389).

Table K-3. Allowable TDS load for Flat River Drainage Canal (subsegment 100406) northeast of Bossier City, Louisiana (station 389)

Date	Observed flow (cfs)	Percent exceedance for observed flow	Adjusted flow for entire basin			Width for area under curves (%)	Allowable load to meet standard (tons/day)/mi ²	Target load with MOs incorporated (tons/day)/mi ²	Area under TMDL curve (tons/day/mi ²)
			cfs	cfs/mi ²	cfs/mi ²				
10/4/82	2	100.000	0.0223	0.002	0.000	0.00	0.0017	0.0015	0.00E+00
10/5/82	2	100.000	0.0223	0.002	0.000	0.00	0.0017	0.0015	0.00E+00
10/6/82	2	100.000	0.0223	0.002	0.000	0.00	0.0017	0.0015	0.00E+00
9/18/82	3	100.000	0.0334	0.003	0.000	0.00	0.0025	0.0022	0.00E+00
9/19/82	3	100.000	0.0334	0.003	0.000	0.00	0.0025	0.0022	0.00E+00
10/1/82	3	100.000	0.0334	0.003	0.000	0.00	0.0025	0.0022	0.00E+00
10/2/82	3	100.000	0.0334	0.003	0.000	0.00	0.0025	0.0022	0.00E+00
10/2/82	3	100.000	0.0334	0.003	0.000	0.00	0.0025	0.0022	0.00E+00
10/3/82	3	100.000	0.0334	0.003	0.000	0.00	0.0025	0.0022	0.00E+00
9/24/87	3	100.000	0.0334	0.003	0.000	0.00	0.0025	0.0022	0.00E+00
9/25/87	3	100.000	0.0334	0.003	0.000	0.00	0.0025	0.0022	0.00E+00
9/26/87	3	100.000	0.0334	0.003	0.000	0.00	0.0025	0.0022	0.00E+00
9/27/87	3	100.000	0.0334	0.003	0.000	0.10	0.0025	0.0022	2.48E-06
For brevity most of the cells in this spreadsheet have been hidden.									
5/5/97	5820	0.200	64.7758	5.939	0.168	0.00	4.8015	4.3214	0.00E+00
5/4/91	5870	0.200	65.3323	5.990	0.170	0.00	4.8428	4.3585	0.00E+00
5/6/91	5890	0.200	65.5549	6.010	0.170	0.00	4.8593	4.3733	0.00E+00
4/9/97	5900	0.200	65.6662	6.020	0.170	0.00	4.8675	4.3808	0.00E+00
5/4/97	5910	0.200	65.7775	6.031	0.171	0.10	4.8758	4.3882	4.88E-03
5/5/91	5970	0.100	66.4453	6.092	0.173	0.00	4.9253	4.4327	0.00E+00
4/8/97	6020	0.100	67.0018	6.143	0.174	0.00	4.9665	4.4699	0.00E+00
4/16/91	6130	0.100	68.2261	6.255	0.177	0.00	5.0573	4.5516	0.00E+00
4/7/97	6190	0.100	68.8939	6.316	0.179	0.00	5.1068	4.5961	0.00E+00
4/6/97	6370	0.100	70.8973	6.500	0.184	0.00	5.2553	4.7298	0.00E+00
4/13/91	6500	0.100	72.3441	6.633	0.188	0.00	5.3625	4.8263	0.00E+00
4/14/91	6620	0.100	73.6797	6.755	0.191	0.10	5.4615	4.9154	5.46E-03
4/15/91	6630	0.000	73.7910	6.765	0.192	0.00	5.4698	4.9228	0.00E+00

Table K-4. Existing TDS load and percent reduction for Flat River Drainage Canal (subsegment 100406) northeast of Bossier City, Louisiana (station 389)

Date	Observed Concentration (mg/L)	Flow/unit area on sampling day (cms/mi ²)	Percent exceedance for flow on sampling day	Current TDS load (tons/day)/mi ²	Reduced TDS load (tons/day)/mi ²	Allowable load with MOS incorporated (tons/day)/mi ²	Reduced load less than or equal to allow load?
12/11/90	380	0.022046807	44.6	7.973E-01	5.665E-01	5.665E-01	Yes
11/14/90	158	0.008437310	58.3	1.269E-01	9.015E-02	2.168E-01	Yes

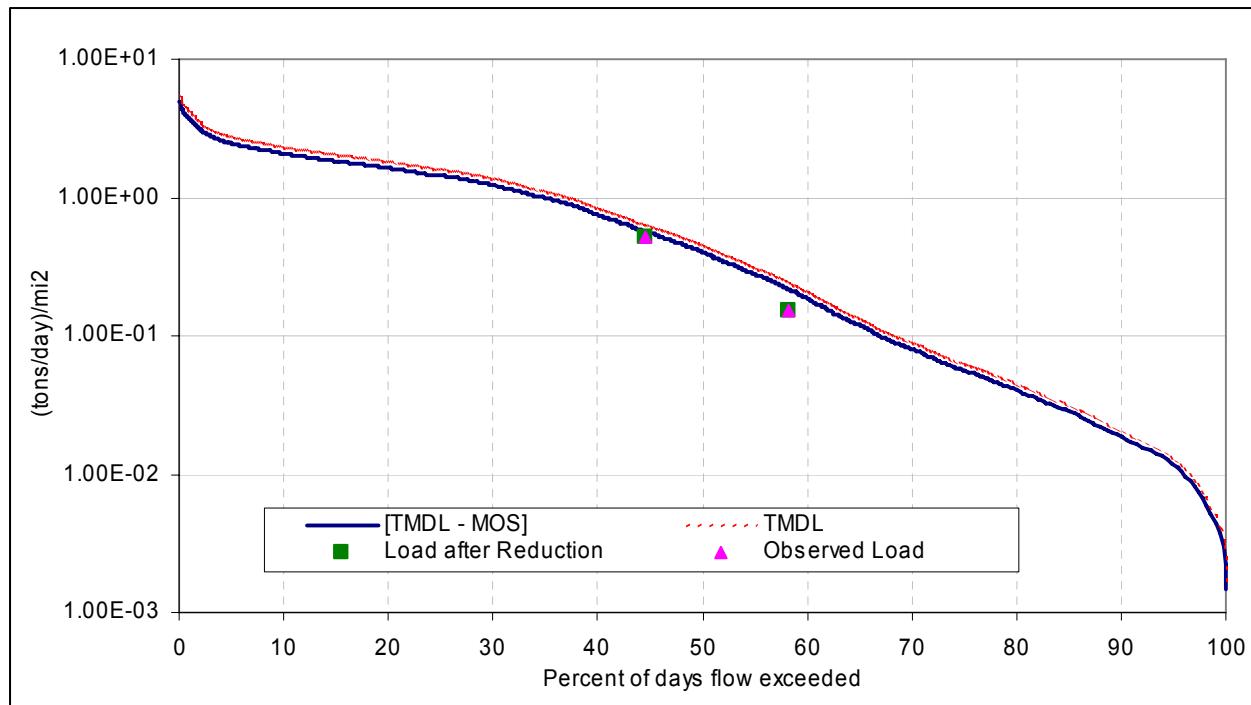


Figure K-3. TDS load duration curve for Flat River Drainage Canal (subsegment 100406) northeast of Shreveport, Louisiana (station 390).

Table K-5. Allowable TDS load for Flat River Drainage Canal (subsegment 100406) northeast of Shreveport, Louisiana (station 390)

Date	Observed flow (cfs)	Percent exceedance for observed flow	Adjusted flow for entire basin			Width for area under curves (%)	Allowable load to meet standard (tons/day)/mi ²	Target load with MOS incorporated (tons/day)/mi ²	Area under TMDL curve (tons/day/mi ²)
			cfs	cfs/mi ²	cms/mi ²				
10/4/82	2	100.000	0.0223	0.002	0.000	0.00	0.0017	0.0015	0.00E+00
10/5/82	2	100.000	0.0223	0.002	0.000	0.00	0.0017	0.0015	0.00E+00
10/6/82	2	100.000	0.0223	0.002	0.000	0.00	0.0017	0.0015	0.00E+00
9/18/82	3	100.000	0.0334	0.003	0.000	0.00	0.0025	0.0022	0.00E+00
9/19/82	3	100.000	0.0334	0.003	0.000	0.00	0.0025	0.0022	0.00E+00
10/1/82	3	100.000	0.0334	0.003	0.000	0.00	0.0025	0.0022	0.00E+00
10/2/82	3	100.000	0.0334	0.003	0.000	0.00	0.0025	0.0022	0.00E+00
10/3/82	3	100.000	0.0334	0.003	0.000	0.00	0.0025	0.0022	0.00E+00
9/24/87	3	100.000	0.0334	0.003	0.000	0.00	0.0025	0.0022	0.00E+00
9/25/87	3	100.000	0.0334	0.003	0.000	0.00	0.0025	0.0022	0.00E+00
9/26/87	3	100.000	0.0334	0.003	0.000	0.00	0.0025	0.0022	0.00E+00
9/27/87	3	100.000	0.0334	0.003	0.000	0.10	0.0025	0.0022	2.48E-06
For brevity most of the cells in this spreadsheet have been hidden.									
5/5/97	5820	0.200	64.7758	5.939	0.168	0.00	4.8015	4.3214	0.00E+00
5/4/91	5870	0.200	65.3323	5.990	0.170	0.00	4.8428	4.3585	0.00E+00
5/6/91	5890	0.200	65.5549	6.010	0.170	0.00	4.8593	4.3733	0.00E+00
4/9/97	5900	0.200	65.6662	6.020	0.170	0.00	4.8675	4.3808	0.00E+00
5/4/97	5910	0.200	65.7775	6.031	0.171	0.10	4.8758	4.3882	4.88E-03
5/5/91	5970	0.100	66.4453	6.092	0.173	0.00	4.9253	4.4327	0.00E+00
4/8/97	6020	0.100	67.0018	6.143	0.174	0.00	4.9665	4.4699	0.00E+00
4/16/91	6130	0.100	68.2261	6.255	0.177	0.00	5.0573	4.5516	0.00E+00
4/7/97	6190	0.100	68.8939	6.316	0.179	0.00	5.1068	4.5961	0.00E+00
4/6/97	6370	0.100	70.8973	6.500	0.184	0.00	5.2553	4.7298	0.00E+00
4/13/91	6500	0.100	72.3441	6.633	0.188	0.00	5.3625	4.8263	0.00E+00
4/14/91	6620	0.100	73.6797	6.755	0.191	0.10	5.4615	4.9154	5.46E-03
4/15/91	6630	0.000	73.7910	6.765	0.192	0.00	5.4698	4.9228	0.00E+00

Table K-6. Existing TDS load and percent reduction for Flat River Drainage Canal (subsegment 100406) northeast of Shreveport, Louisiana (station 390)

Date	Observed Concentration (mg/L)	Flow/unit area on sampling day (cms/mi ²)	Percent exceedance for flow on sampling day	Current TDS load (tons/day)/mi ²	Reduced TDS load (tons/day)/mi ²	Allowable load with MOS incorporated (tons/day)/mi ²	Reduced load less than or equal to allow load?
12/11/90	526	0.022046807	44.6	1.104E+00	5.665E-01	5.665E-01	Yes
11/14/90	298	0.00843731	58.3	2.393E-01	1.228E-01	2.168E-01	Yes

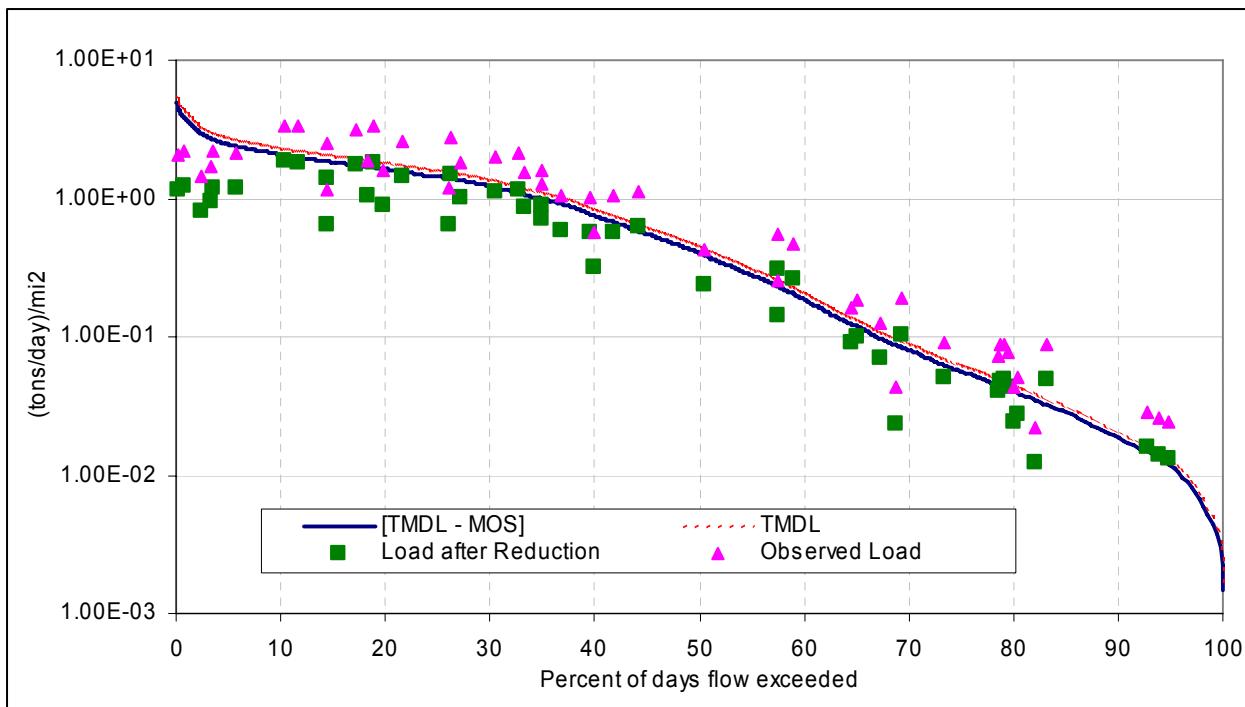
**Figure K-4. TDS load duration curve for Flat River (subsegment 100406) east of Taylortown, Louisiana (station 272).**

Table K-7. Allowable TDS load for Flat River (subsegment 100406) east of Taylortown, Louisiana (station 272)

Date	Observed flow (cfs)	Percent exceedance for observed flow	Adjusted flow for entire basin			Width for area under curves (%)	Allowable load to meet standard (tons/day)/mi ²	Target load with MOS incorporated (tons/day)/mi ²	Area under TMDL curve (tons/day/mi ²)
			cfs	cfs/mi ²	cms/mi ²				
10/4/82	2	100.000	0.0223	0.002	0.000	0.00	0.0017	0.0015	0.00E+00
10/5/82	2	100.000	0.0223	0.002	0.000	0.00	0.0017	0.0015	0.00E+00
10/6/82	2	100.000	0.0223	0.002	0.000	0.00	0.0017	0.0015	0.00E+00
9/18/82	3	100.000	0.0334	0.003	0.000	0.00	0.0025	0.0022	0.00E+00
9/19/82	3	100.000	0.0334	0.003	0.000	0.00	0.0025	0.0022	0.00E+00
10/1/82	3	100.000	0.0334	0.003	0.000	0.00	0.0025	0.0022	0.00E+00
10/2/82	3	100.000	0.0334	0.003	0.000	0.00	0.0025	0.0022	0.00E+00
10/3/82	3	100.000	0.0334	0.003	0.000	0.00	0.0025	0.0022	0.00E+00
9/24/87	3	100.000	0.0334	0.003	0.000	0.00	0.0025	0.0022	0.00E+00
9/25/87	3	100.000	0.0334	0.003	0.000	0.00	0.0025	0.0022	0.00E+00
9/26/87	3	100.000	0.0334	0.003	0.000	0.00	0.0025	0.0022	0.00E+00
9/27/87	3	100.000	0.0334	0.003	0.000	0.10	0.0025	0.0022	2.48E-06
For brevity most of the cells in this spreadsheet have been hidden.									
5/15/97	5820	0.200	64.7758	5.939	0.168	0.00	4.8015	4.3214	0.00E+00
5/4/91	5870	0.200	65.3323	5.990	0.170	0.00	4.8428	4.3585	0.00E+00
5/6/91	5890	0.200	65.5549	6.010	0.170	0.00	4.8593	4.3733	0.00E+00
4/9/97	5900	0.200	65.6662	6.020	0.170	0.00	4.8675	4.3808	0.00E+00
5/4/97	5910	0.200	65.7775	6.031	0.171	0.10	4.8758	4.3882	4.88E-03
5/5/91	5970	0.100	66.4453	6.092	0.173	0.00	4.9253	4.4327	0.00E+00
4/8/97	6020	0.100	67.0018	6.143	0.174	0.00	4.9665	4.4699	0.00E+00
4/16/91	6130	0.100	68.2261	6.255	0.177	0.00	5.0573	4.5516	0.00E+00
4/7/97	6190	0.100	68.8939	6.316	0.179	0.00	5.1068	4.5961	0.00E+00
4/6/97	6370	0.100	70.8973	6.500	0.184	0.00	5.2553	4.7298	0.00E+00
4/13/91	6500	0.100	72.3441	6.633	0.188	0.00	5.3625	4.8263	0.00E+00
4/14/91	6620	0.100	73.6797	6.755	0.191	0.10	5.4615	4.9154	5.46E-03
4/15/91	6630	0.000	73.7910	6.765	0.192	0.00	5.4698	4.9228	0.00E+00

Table K-8. Existing TDS load and percent reduction for Flat River (subsegment 100406) east of Taylortown, Louisiana (station 272)

Date	Observed Concentration (mg/L)	Flow/unit area on sampling day (cms/mi ²)	Percent exceedance for flow on sampling day	Current TDS load (tons/day)/mi ²	Reduced TDS load (tons/day)/mi ²	Allowable load with MOS incorporated (tons/day)/mi ²	Reduced load less than or equal to allow load?
12/11/90	250	0.022046807	44.6	5.246E-01	5.246E-01	5.665E-01	Yes
11/14/90	190	0.008437310	58.3	1.526E-01	1.526E-01	2.168E-01	Yes

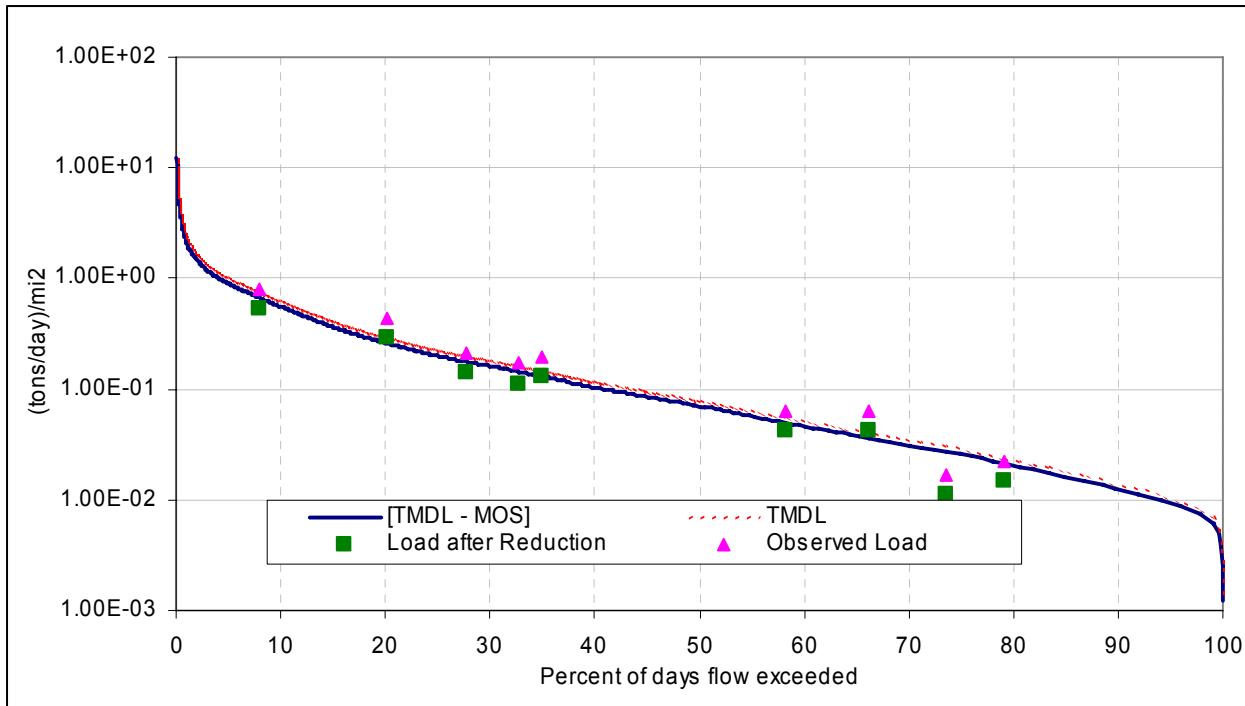
**Figure K-5. TDS load duration curve for unnamed tributary of Castor Creek (subsegment 100708) near Castor, Louisiana (station 1194).**

Table K-9. Allowable TDS load for unnamed tributary of Castor Creek (subsegment 100708) near Castor, Louisiana (station 1194)

Date	Observed flow (cfs)	Percent exceedance for observed flow	Adjusted flow for entire basin			Width for area under curves (%)	Allowable load to meet standard (tons/day)/mi ²	Target load with MOS incorporated (tons/day)/mi ²	Area under TMDL curve (tons/day/mi ²)
			cfs	cfs*	cfs/mi ²				
8/31/00	1	100.000	0.0023	0.0797	0.006	0.00	0.0014	0.0012	0.00E+00
9/1/00	1	100.000	0.0023	0.0797	0.006	0.00	0.0014	0.0012	0.00E+00
9/6/00	1	100.000	0.0023	0.0797	0.006	0.00	0.0014	0.0012	0.00E+00
8/14/00	2	100.000	0.0046	0.0820	0.013	0.00	0.0028	0.0025	0.00E+00
8/15/00	2	100.000	0.0046	0.0820	0.013	0.00	0.0028	0.0025	0.00E+00
8/16/00	2	100.000	0.0046	0.0820	0.013	0.00	0.0028	0.0025	0.00E+00
8/17/00	2	100.000	0.0046	0.0820	0.013	0.00	0.0028	0.0025	0.00E+00
8/21/00	2	100.000	0.0046	0.0820	0.013	0.00	0.0028	0.0025	0.00E+00
8/22/00	2	100.000	0.0046	0.0820	0.013	0.00	0.0028	0.0025	0.00E+00
8/28/00	2	100.000	0.0046	0.0820	0.013	0.00	0.0028	0.0025	0.00E+00
8/29/00	2	100.000	0.0046	0.0820	0.013	0.00	0.0028	0.0025	0.00E+00
8/30/00	2	100.000	0.0046	0.0820	0.013	0.00	0.0028	0.0025	0.00E+00
6/30/89	5930	0.100	13.7826	13.8599	38.506	1.090	0.00	8.1983	7.3784
3/8/95	5950	0.100	13.8290	13.9064	38.636	1.094	0.00	8.2259	7.4033
7/2/89	6040	0.100	14.0382	14.1156	39.221	1.111	0.00	8.3503	7.5153
5/6/89	6060	0.100	14.0847	14.1621	39.351	1.114	0.00	8.3780	7.5402
7/1/89	6200	0.100	14.4101	14.4874	40.260	1.140	0.00	8.5715	7.7144
1/31/99	6370	0.100	14.8052	14.8826	41.364	1.171	0.00	8.8066	7.9259
4/30/91	6420	0.100	14.9214	14.9988	41.688	1.180	0.00	8.8757	7.9881
2/20/91	6660	0.100	15.4792	15.5566	43.247	1.225	0.00	9.2075	8.2868
12/28/82	6720	0.100	15.6187	15.6960	43.636	1.236	0.00	9.2905	8.3614
12/13/01	6970	0.100	16.1997	16.2771	45.260	1.282	0.00	9.6361	8.6725
5/19/89	8050	0.100	18.7099	18.7872	52.273	1.480	0.00	11.1292	10.0163
1/30/99	8590	0.100	19.9649	20.0423	55.779	1.580	0.10	11.8757	10.6882
4/23/95	9730	0.000	22.6145	22.6919	63.182	1.789	0.00	13.4518	12.1066

For brevity most of the cells in this spreadsheet have been hidden.

* Flow was adjusted to include WTP flow, as watershed area is too small.

Table K-10. Existing TDS load and percent reduction for unnamed tributary of Castor Creek (subsegment 100708) near Castor, Louisiana (station 1194)

Date	Observed Concentration (mg/L)	Flow/unit area on sampling day (cms/mi ²)	Percent exceedance for flow on sampling day	Current TDS load (tons/day)/mi ²	Reduced TDS load (tons/day)/mi ²	Allowable load with MOS incorporated (tons/day)/mi ²	Reduced load less than or equal to allow load?
5/13/02	126	0.005332422	66.2	6.395E-02	3.608E-02	3.608E-02	Yes
3/18/02	119	0.038430214	20.1	4.352E-01	2.456E-01	2.600E-01	Yes
12/9/02	108	0.019307045	34.9	1.985E-01	1.120E-01	1.306E-01	Yes
11/12/02	92	0.007355065	58.2	6.440E-02	3.634E-02	4.977E-02	Yes
4/8/02	87	0.098557870	8.0	8.133E-01	4.589E-01	6.669E-01	Yes
1/14/02	85	0.021145812	32.8	1.717E-01	9.687E-02	1.431E-01	Yes
2/18/02	85	0.026110481	27.7	2.120E-01	1.196E-01	1.767E-01	Yes
7/15/02	76	0.003125903	79.2	2.261E-02	1.276E-02	2.115E-02	Yes
6/10/02	44	0.004045286	73.6	1.694E-02	9.559E-03	2.737E-02	Yes

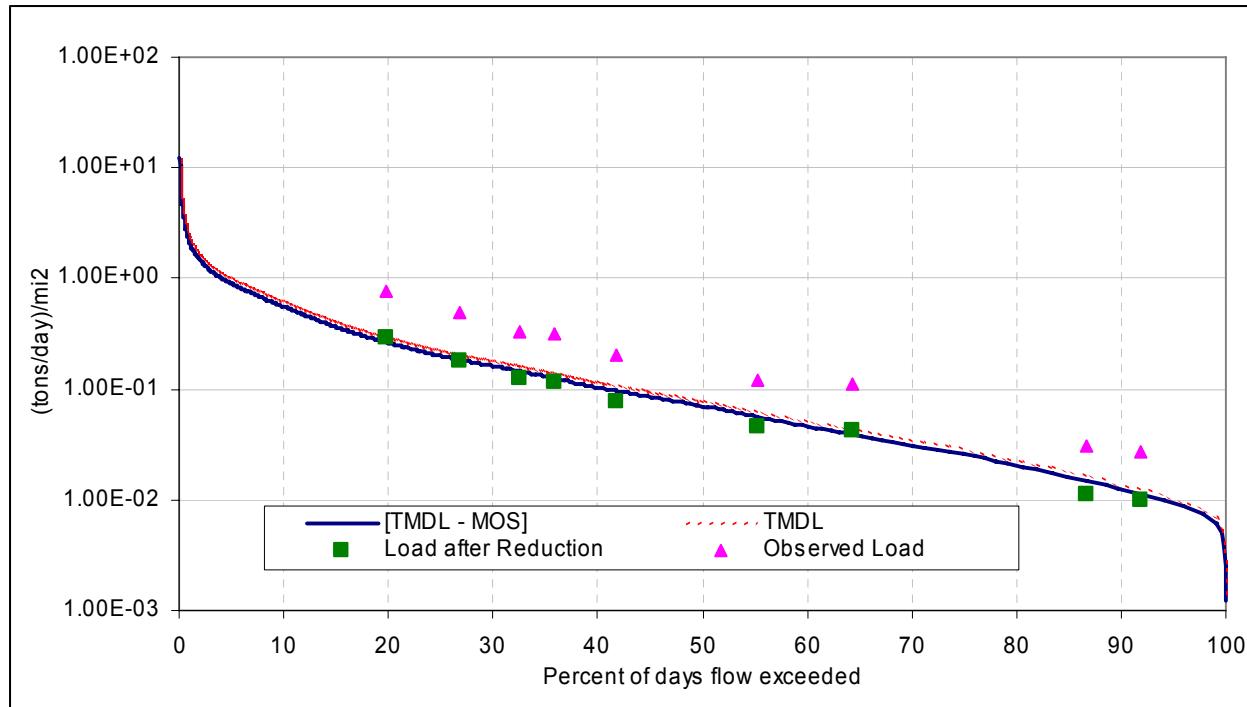
**Figure K-6. TDS load duration curve for unnamed tributary of Grand Bayou (subsegment 100710) near Hall Summit, Louisiana (station 1195).**

Table K-11. Allowable TDS load for unnamed tributary of Grand Bayou (subsegment 100710) near Hall Summit, Louisiana (station 1195)

Date	Observed flow (cfs)	Percent exceedance for observed flow	Adjusted flow for entire basin			Width for area under curves (%)	Allowable load to meet standard (tons/day)/mi ²	Target load with MOS incorporated (tons/day)/mi ²	Area under TMDL curve (tons/day/mi ²)
			cfs	cfs*	cfs/mi ²				
8/31/00	1	100,000	0.0005	0.0778	1.085	0.031	0.00	0.2309	0.2078
9/1/00	1	100,000	0.0005	0.0778	1.085	0.031	0.00	0.2309	0.2078
9/6/00	1	100,000	0.0005	0.0778	1.085	0.031	0.00	0.2309	0.2078
8/14/00	2	100,000	0.0009	0.0783	1.091	0.031	0.00	0.2323	0.2091
8/15/00	2	100,000	0.0009	0.0783	1.091	0.031	0.00	0.2323	0.2091
8/16/00	2	100,000	0.0009	0.0783	1.091	0.031	0.00	0.2323	0.2091
8/17/00	2	100,000	0.0009	0.0783	1.091	0.031	0.00	0.2323	0.2091
8/21/00	2	100,000	0.0009	0.0783	1.091	0.031	0.00	0.2323	0.2091
8/22/00	2	100,000	0.0009	0.0783	1.091	0.031	0.00	0.2323	0.2091
8/28/00	2	100,000	0.0009	0.0783	1.091	0.031	0.00	0.2323	0.2091
8/29/00	2	100,000	0.0009	0.0783	1.091	0.031	0.00	0.2323	0.2091
8/30/00	2	100,000	0.0009	0.0783	1.091	0.031	0.00	0.2323	0.2091
6/30/89	5930	0.100	2.7633	2.8406	39.585	1.121	0.00	8.4278	7.5850
3/8/95	5950	0.100	2.7726	2.8499	39.714	1.125	0.00	8.4554	7.6099
7/2/89	6040	0.100	2.8145	2.8919	40.299	1.141	0.00	8.5799	7.7219
5/6/89	6060	0.100	2.8238	2.9012	40.429	1.145	0.00	8.6075	7.7468
7/1/89	6200	0.100	2.8891	2.9664	41.338	1.171	0.00	8.8011	7.9210
1/31/99	6370	0.100	2.9683	3.0457	42.442	1.202	0.00	9.0361	8.1325
4/30/91	6420	0.100	2.9916	3.0690	42.766	1.211	0.00	9.1052	8.1947
2/20/91	6660	0.100	3.1034	3.1808	44.325	1.255	0.00	9.4370	8.4933
12/28/82	6720	0.100	3.1314	3.2083	44.714	1.266	0.00	9.5200	8.5680
12/13/01	6970	0.100	3.2479	3.3252	46.338	1.312	0.00	9.8656	8.8790
5/19/89	8050	0.100	3.7511	3.8285	53.351	1.511	0.00	11.3587	10.2228
1/30/99	8590	0.100	4.0028	4.0801	56.857	1.610	0.10	12.1053	10.8947
4/23/95	9730	0.000	4.5340	4.6114	64.260	1.820	0.00	13.6813	12.3132

For brevity most of the cells in this spreadsheet have been hidden.

* Flow was adjusted to include WTP flow, as watershed area is too small.

Table K-12. Existing TDS load and percent reduction for unnamed tributary of Grand Bayou (subsegment 100710) near Hall Summit, Louisiana (station 1195)

Date	Observed Concentration (mg/L)	Flow/unit area on sampling day (cms/mi ²)	Percent exceedance for flow on sampling day	Current TDS load (tons/day)/mi ²	Reduced TDS load (tons/day)/mi ²	Allowable load with MOS incorporated (tons/day)/mi ²	Reduced load less than or equal to allow load?
3/19/02	205	0.039533474	19.7	7.713E-01	2.675E-01	2.675E-01	Yes
5/14/02	205	0.005700175	64.4	1.112E-01	3.857E-02	3.857E-02	Yes
2/19/02	189	0.027029864	26.8	4.862E-01	1.686E-01	1.829E-01	Yes
1/15/02	177	0.018571539	35.8	3.128E-01	1.085E-01	1.257E-01	Yes
8/5/02	169	0.00165489	91.8	2.662E-02	9.232E-03	1.120E-02	Yes
6/11/02	161	0.021329688	32.6	3.268E-01	1.134E-01	1.443E-01	Yes
11/19/02	153	0.008274448	55.3	1.205E-01	4.179E-02	5.599E-02	Yes
12/10/02	151	0.014342377	41.7	2.061E-01	7.149E-02	9.705E-02	Yes
7/9/02	144	0.002206519	86.6	3.024E-02	1.049E-02	1.493E-02	Yes

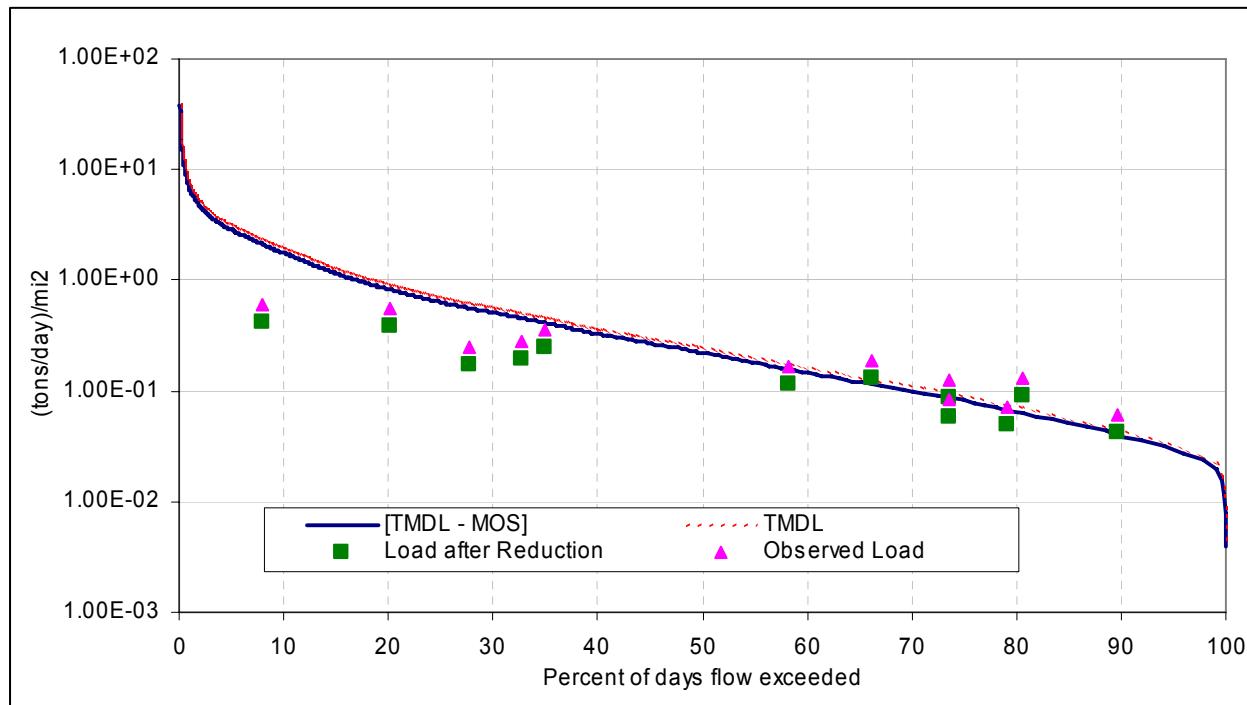
**Figure K-7. TDS load duration curve for unnamed tributary of Saline Bayou (subsegment 100804) near Arcadia, Louisiana (station 1206).**

Table K-13. Allowable TDS load for unnamed tributary of Saline Bayou (subsegment 100804) near Arcadia, Louisiana (station 1206)

Date	Observed flow (cfs)	Percent exceedance for observed flow	Adjusted flow for entire basin			Width for area under curves (%)	Allowable load to meet standard (tons/day)/mi ²	Target load with MOs incorporated (tons/day)/mi ²	Area under TMDL curve (tons/day/mi ²)
			cfs	cfs*	cfs/mi ²				2.99E+00
8/31/00	1	100,000	0.0015	0.7752	3.273	0.093	0.00	2.2052	1.9846
9/1/00	1	100,000	0.0015	0.7752	3.273	0.093	0.00	2.2052	1.9846
9/6/00	1	100,000	0.0015	0.7752	3.273	0.093	0.00	2.2052	1.9846
8/14/00	2	100,000	0.0031	0.7767	3.279	0.093	0.00	2.2095	1.9886
8/15/00	2	100,000	0.0031	0.7767	3.279	0.093	0.00	2.2095	1.9886
8/16/00	2	100,000	0.0031	0.7767	3.279	0.093	0.00	2.2095	1.9886
8/17/00	2	100,000	0.0031	0.7767	3.279	0.093	0.00	2.2095	1.9886
8/21/00	2	100,000	0.0031	0.7767	3.279	0.093	0.00	2.2095	1.9886
8/22/00	2	100,000	0.0031	0.7767	3.279	0.093	0.00	2.2095	1.9886
8/28/00	2	100,000	0.0031	0.7767	3.279	0.093	0.00	2.2095	1.9886
8/29/00	2	100,000	0.0031	0.7767	3.279	0.093	0.00	2.2095	1.9886
8/30/00	2	100,000	0.0031	0.7767	3.279	0.093	0.00	2.2095	1.9886
For brevity most of the cells in this spreadsheet have been hidden.									
6/30/89	5930	0.100	9.1198	9.8934	41.773	1.183	0.00	28.1447	25.3302
3/8/95	5950	0.100	9.1505	9.9241	41.903	1.187	0.00	28.2322	25.4090
7/2/89	6040	0.100	9.2889	10.0625	42.487	1.203	0.00	28.6259	25.7633
5/6/89	6060	0.100	9.3197	10.0933	42.617	1.207	0.00	28.7134	25.8421
7/1/89	6200	0.100	9.5350	10.3086	43.526	1.233	0.00	29.3259	26.3933
1/31/99	6370	0.100	9.7964	10.5701	44.630	1.264	0.00	30.0697	27.0627
4/30/91	6420	0.100	9.8733	10.6469	44.955	1.273	0.00	30.2884	27.2596
2/20/91	6660	0.100	10.2424	11.0160	46.513	1.317	0.00	31.3384	28.2046
12/28/82	6720	0.100	10.3347	11.1083	46.903	1.328	0.00	31.6009	28.4408
12/13/01	6970	0.100	10.7192	11.4928	48.526	1.374	0.00	32.6947	29.4252
5/19/89	8050	0.100	12.3801	13.1537	55.539	1.573	0.00	37.4197	33.6777
1/30/99	8590	0.100	13.2106	13.9842	59.046	1.672	0.10	39.7822	35.8040
4/23/95	9730	0.000	14.9638	15.7374	66.448	1.882	0.00	44.7698	40.2928

* Flow was adjusted to include WTP flow, as watershed area is too small.

Table K-14. Existing TDS load and percent reduction for unnamed tributary of Saline Bayou (subsegment 100804) near Arcadia, Louisiana (station 1206)

Date	Observed Concentration (mg/L)	Flow/unit area on sampling day (cms/mi ²)	Percent exceedance for flow on sampling day	Current TDS load (tons/day)/mi ²	Reduced TDS load (tons/day)/mi ²	Allowable load with MOS incorporated (tons/day)/mi ²	Reduced load less than or equal to allow load?
9/16/02	468	0.002942026	80.6	1.310E-01	6.300E-02	6.300E-02	Yes
5/13/02	368	0.005332422	66.2	1.868E-01	8.979E-02	1.142E-01	Yes
8/12/02	344	0.001838766	89.7	6.020E-02	2.894E-02	3.938E-02	Yes
10/14/02	324	0.004045286	73.6	1.247E-01	5.997E-02	8.663E-02	Yes
11/12/02	238	0.007355065	58.2	1.666E-01	8.010E-02	1.575E-01	Yes
7/15/02	236	0.003125903	79.2	7.021E-02	3.375E-02	6.694E-02	Yes
6/10/02	220	0.004045286	73.6	8.470E-02	4.072E-02	8.663E-02	Yes
12/9/02	193	0.019307045	34.9	3.546E-01	1.705E-01	4.134E-01	Yes
3/18/02	154	0.038430214	20.1	5.633E-01	2.708E-01	8.229E-01	Yes
1/14/02	140	0.021145812	32.8	2.818E-01	1.355E-01	4.528E-01	Yes
2/18/02	100	0.026110481	27.7	2.485E-01	1.195E-01	5.591E-01	Yes
4/8/02	64	0.098557870	8.0	6.003E-01	2.886E-01	2.111E+00	Yes

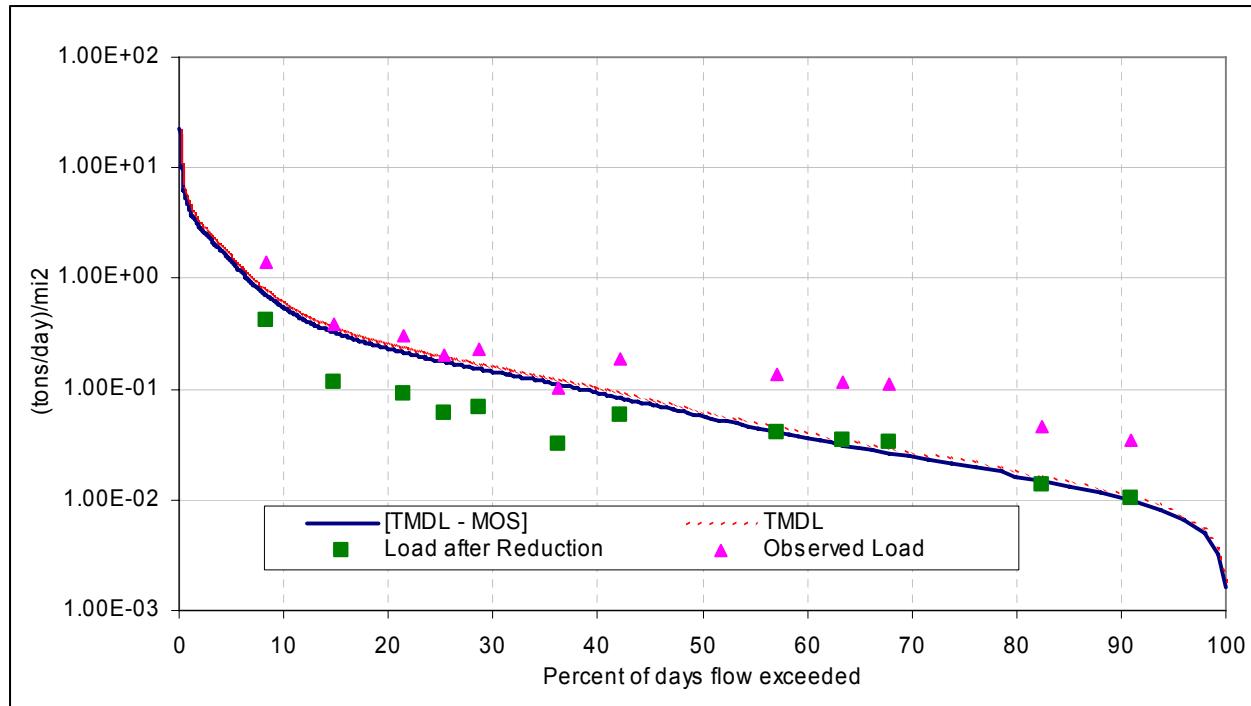
**Figure K-8. TDS load duration curve for Cane River (subsegment 101101) west of Colfax, Louisiana (station 1217).**

Table K-15. Allowable TDS load for Cane River (subsegment 101101) west of Colfax, Louisiana (station 1217)

Date	Observed flow (cfs)	Percent exceedance for observed flow	Adjusted flow for entire basin			Width for area under curves (%)	Allowable load to meet standard (tons/day)/mi ²	Target load with MOS incorporated (tons/day)/mi ²	Area under TMDL curve (tons/day/mi ²)
			cfs	cfs/mi ²	cms/mi ²				
7/12/98	1	100.000	0.2110	0.007	0.000	0.00	0.0018	0.0016	0.00E+00
7/13/98	1	100.000	0.2110	0.007	0.000	0.00	0.0018	0.0016	0.00E+00
7/14/98	1	100.000	0.2110	0.007	0.000	0.00	0.0018	0.0016	0.00E+00
7/23/98	1	100.000	0.2110	0.007	0.000	0.00	0.0018	0.0016	0.00E+00
7/24/98	1	100.000	0.2110	0.007	0.000	0.00	0.0018	0.0016	0.00E+00
7/25/98	1	100.000	0.2110	0.007	0.000	0.00	0.0018	0.0016	0.00E+00
7/27/98	1	100.000	0.2110	0.007	0.000	0.00	0.0018	0.0016	0.00E+00
7/29/98	1	100.000	0.2110	0.007	0.000	0.00	0.0018	0.0016	0.00E+00
7/30/98	1	100.000	0.2110	0.007	0.000	0.00	0.0018	0.0016	0.00E+00
7/31/98	1	100.000	0.2110	0.007	0.000	0.00	0.0018	0.0016	0.00E+00
8/1/98	1	100.000	0.2110	0.007	0.000	0.00	0.0018	0.0016	0.00E+00
8/2/98	1	100.000	0.2110	0.007	0.000	0.00	0.0018	0.0016	0.00E+00
11/15/98	6580	0.200	1388.0723	44.459	1.259	0.00	11.9819	10.7837	0.00E+00
7/1/89	6640	0.200	1400.7295	44.865	1.270	0.00	12.0911	10.8820	0.00E+00
1/14/89	6860	0.200	1447.1392	46.351	1.313	0.00	12.4918	11.2426	0.00E+00
5/19/89	7130	0.200	1504.0966	48.176	1.364	0.00	12.9834	11.6851	0.00E+00
12/27/82	7540	0.200	1590.5875	50.946	1.443	0.10	13.7300	12.3570	1.37E-02
11/29/01	7840	0.100	1653.8734	52.973	1.500	0.00	14.2763	12.8487	0.00E+00
1/7/98	8610	0.100	1816.3074	58.176	1.647	0.00	15.6784	14.1106	0.00E+00
5/21/83	9070	0.100	1913.3459	61.284	1.735	0.00	16.5161	14.8645	0.00E+00
6/29/89	9670	0.100	2039.9179	65.338	1.850	0.00	17.6086	15.8478	0.00E+00
12/28/82	10200	0.100	2151.7231	68.919	1.952	0.00	18.5738	16.7164	0.00E+00
7/2/89	10700	0.100	2257.1997	72.297	2.047	0.00	19.4842	17.5358	0.00E+00
6/28/89	12100	0.100	2552.5342	81.757	2.315	0.10	22.0336	19.8302	2.20E-02
1/30/99	13900	0.000	2932.2501	93.919	2.660	0.00	25.3113	22.7802	0.00E+00

For brevity most of the cells in this spreadsheet have been hidden.

Table K-16. Existing TDS load and percent reduction for Cane River (subsegment 101101) west of Colfax, Louisiana (station 1217)

Date	Observed Concentration (mg/L)	Flow/unit area on sampling day (cms/mi ²)	Percent exceedance for flow on sampling day	Current TDS load (tons/day)/mi ²	Reduced TDS load (tons/day)/mi ²	Allowable load with MOS incorporated (tons/day)/mi ²	Reduced load less than or equal to allow load?
9/23/02	384	0.003061297	67.9	1.119E-01	2.622E-02	2.622E-02	Yes
8/19/02	334	0.003635291	63.4	1.156E-01	2.708E-02	3.114E-02	Yes
6/17/02	310	0.001147986	91.0	3.387E-02	7.938E-03	9.833E-03	Yes
5/20/02	299	0.004783277	57.2	1.361E-01	3.190E-02	4.097E-02	Yes
7/22/02	276	0.001721980	82.5	4.523E-02	1.060E-02	1.475E-02	Yes
3/25/02	205	0.009757885	42.1	1.904E-01	4.462E-02	8.358E-02	Yes
10/21/02	179	0.081889703	8.4	1.395E+00	3.270E-01	7.014E-01	Yes
2/25/02	134	0.017793791	28.6	2.269E-01	5.319E-02	1.524E-01	Yes
1/28/02	125	0.025064372	21.5	2.982E-01	6.989E-02	2.147E-01	Yes
12/16/02	107	0.038074885	14.8	3.877E-01	9.088E-02	3.261E-01	Yes
4/15/02	102	0.020663757	25.3	2.006E-01	4.701E-02	1.770E-01	Yes
11/19/02	85	0.012819182	36.2	1.041E-01	2.439E-02	1.098E-01	Yes

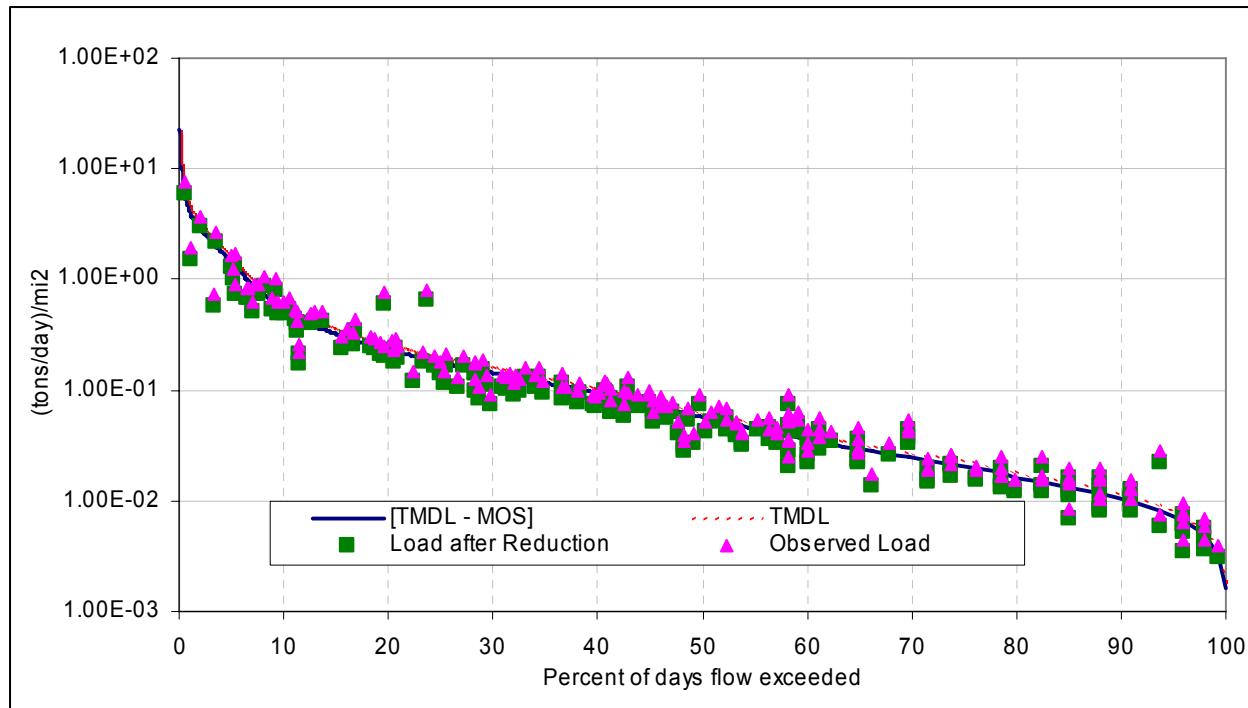
**Figure K-9. TDS load duration curve for Kisatchie Bayou (subsegment 101103) near Lotus, Louisiana (station 42).**

Table K-17. Allowable TDS load for Kisatchie Bayou (subsegment 101103) near Lotus, Louisiana (station 42)

Date	Observed flow (cfs)	Percent exceedance for observed flow	Adjusted flow for entire basin			Width for area under curves (%)	Allowable load to meet standard (tons/day)/mi ²	Target load with MOS incorporated (tons/day)/mi ²	Area under TMDL curve (tons/day/mi ²)	3.35E-01 0.000E+00
			cfs	cfs/mi ²	cms/mi ²					
7/12/98	1	100.000	0.2286	0.007	0.000	0.00	0.002	0.002	0.000E+00	0.000E+00
7/13/98	1	100.000	0.2286	0.007	0.000	0.00	0.002	0.002	0.000E+00	0.000E+00
7/14/98	1	100.000	0.2286	0.007	0.000	0.00	0.002	0.002	0.000E+00	0.000E+00
7/23/98	1	100.000	0.2286	0.007	0.000	0.00	0.002	0.002	0.000E+00	0.000E+00
7/24/98	1	100.000	0.2286	0.007	0.000	0.00	0.002	0.002	0.000E+00	0.000E+00
7/25/98	1	100.000	0.2286	0.007	0.000	0.00	0.002	0.002	0.000E+00	0.000E+00
7/27/98	1	100.000	0.2286	0.007	0.000	0.00	0.002	0.002	0.000E+00	0.000E+00
7/29/98	1	100.000	0.2286	0.007	0.000	0.00	0.002	0.002	0.000E+00	0.000E+00
7/30/98	1	100.000	0.2286	0.007	0.000	0.00	0.002	0.002	0.000E+00	0.000E+00
7/31/98	1	100.000	0.2286	0.007	0.000	0.00	0.002	0.002	0.000E+00	0.000E+00
8/1/98	1	100.000	0.2286	0.007	0.000	0.00	0.002	0.002	0.000E+00	0.000E+00
8/2/98	1	100.000	0.2286	0.007	0.000	0.00	0.002	0.002	0.000E+00	0.000E+00
11/15/98	6580	0.200	1504.1293	44.459	1.259	0.00	11.982	10.784	0.000E+00	0.000E+00
7/1/89	6640	0.200	1517.8448	44.865	1.270	0.00	12.091	10.882	0.000E+00	0.000E+00
1/14/89	6860	0.200	1568.1348	46.351	1.313	0.00	12.492	11.243	0.000E+00	0.000E+00
5/19/89	7130	0.200	1629.8544	48.176	1.364	0.00	12.983	11.685	0.000E+00	0.000E+00
12/27/82	7540	0.200	1723.5768	50.946	1.443	0.10	13.730	12.357	1.37E-02	
11/29/01	7840	0.100	1792.1541	52.973	1.500	0.00	14.276	12.849	0.000E+00	
1/7/98	8610	0.100	1968.1692	58.176	1.647	0.00	15.678	14.111	0.000E+00	
5/21/83	9070	0.100	2073.3211	61.284	1.735	0.00	16.516	14.864	0.000E+00	
6/29/89	9670	0.100	2210.4758	65.338	1.850	0.00	17.609	15.848	0.000E+00	
12/28/82	10200	0.100	2331.6290	68.919	1.952	0.00	18.574	16.716	0.000E+00	
7/2/89	10700	0.100	2445.9246	72.297	2.047	0.00	19.484	17.536	0.000E+00	
6/28/89	12100	0.100	2765.9521	81.757	2.315	0.10	22.034	19.830	2.20E-02	
1/30/99	13900	0.000	3177.4160	93.919	2.660	0.00	25.311	22.780	0.000E+00	

For brevity most of the cells in this spreadsheet have been hidden.

Table K-18. Existing TDS load and percent reduction for Kisatchie Bayou (subsegment 101103) near Lotus, Louisiana (station 42)

Date	Observed Concentration (mg/L)	Flow/unit area on sampling day (cms/mi ²)	Percent exceedance for flow on sampling day	Current TDS load (tons/day)/mi ²	Reduced TDS load (tons/day)/mi ²	Allowable load with MOS incorporated (tons/day)/mi ²	Reduced load less than or equal to allow load?
5/20/02	117	0.004783277	57.2	5.326E-02	4.097E-02	4.097E-02	Yes
1/28/02	109	0.025064372	21.5	2.600E-01	2.000E-01	2.147E-01	Yes
7/22/02	109	0.001721980	82.5	1.786E-02	1.374E-02	1.475E-02	Yes
3/25/02	105	0.009757885	42.1	9.751E-02	7.501E-02	8.358E-02	Yes
6/17/02	99	0.001147986	91.0	1.085E-02	8.346E-03	9.833E-03	Yes
9/23/02	92	0.003061297	67.9	2.680E-02	2.062E-02	2.622E-02	Yes
8/19/02	91	0.003635291	63.4	3.138E-02	2.414E-02	3.114E-02	Yes
2/25/02	87	0.017793791	28.6	1.478E-01	1.137E-01	1.524E-01	Yes
11/19/02	87	0.012819182	36.2	1.058E-01	8.137E-02	1.098E-01	Yes
12/16/02	86	0.038074885	14.8	3.116E-01	2.397E-01	3.261E-01	Yes
10/21/02	85	0.081889703	8.4	6.648E-01	5.114E-01	7.014E-01	Yes
4/15/02	80	0.020663757	25.3	1.573E-01	1.210E-01	1.770E-01	Yes

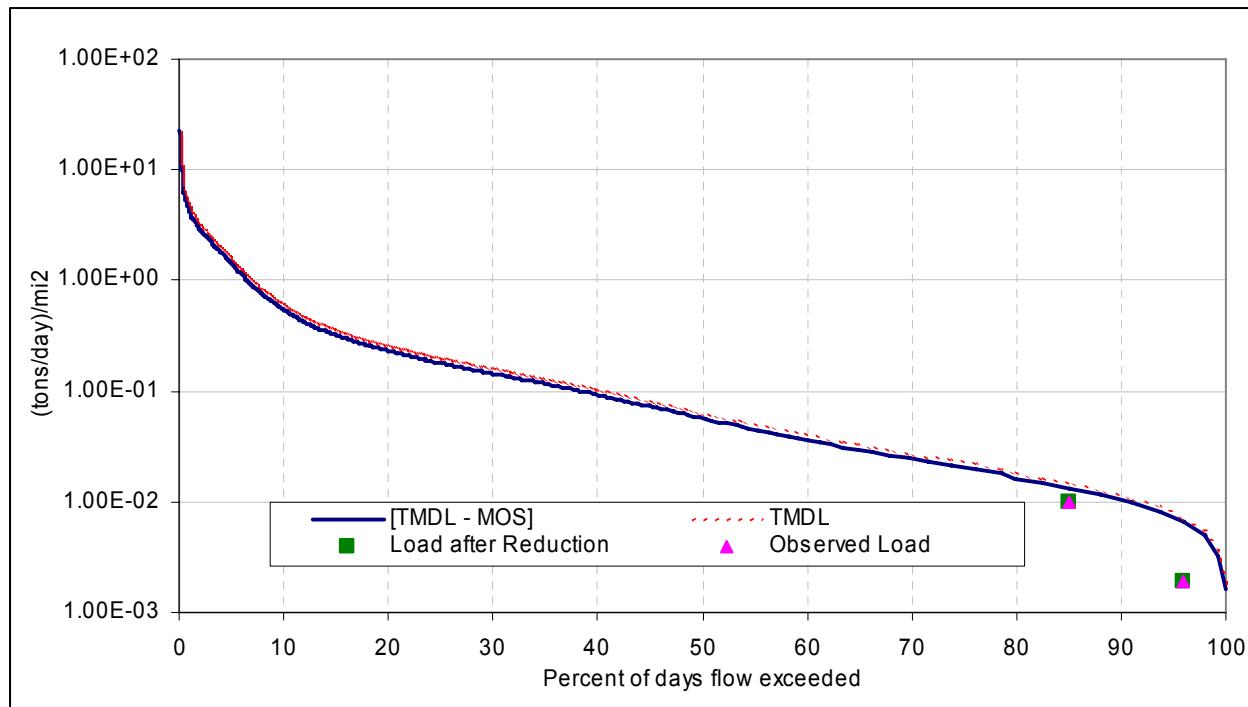
**Figure K-10. TDS load duration curve for Little Sandy Creek (subsegment 101103) at Kisatchie, Louisiana (station 550).**

Table K-19. Allowable TDS load for Little Sandy Creek (subsegment 101103) at Kisatchie, Louisiana (station 550)

Date	Observed flow (cfs)	Percent exceedance for observed flow	Adjusted flow for entire basin			Width for area under curves (%)	Allowable load to meet standard (tons/day)/mi ²	Target load with MOs incorporated (tons/day)/mi ²	Area under TMDL curve (tons/day/mi ²)
			cfs	cfs/mi ²	cms/mi ²				
7/12/98	1	100.000	0.22836	0.007	0.000	0.00	0.002	0.002	0.00E+00
7/13/98	1	100.000	0.22836	0.007	0.000	0.00	0.002	0.002	0.00E+00
7/14/98	1	100.000	0.22836	0.007	0.000	0.00	0.002	0.002	0.00E+00
7/23/98	1	100.000	0.22836	0.007	0.000	0.00	0.002	0.002	0.00E+00
7/24/98	1	100.000	0.22836	0.007	0.000	0.00	0.002	0.002	0.00E+00
7/25/98	1	100.000	0.22836	0.007	0.000	0.00	0.002	0.002	0.00E+00
7/27/98	1	100.000	0.22836	0.007	0.000	0.00	0.002	0.002	0.00E+00
7/29/98	1	100.000	0.22836	0.007	0.000	0.00	0.002	0.002	0.00E+00
7/30/98	1	100.000	0.22836	0.007	0.000	0.00	0.002	0.002	0.00E+00
7/31/98	1	100.000	0.22836	0.007	0.000	0.00	0.002	0.002	0.00E+00
8/1/98	1	100.000	0.22836	0.007	0.000	0.00	0.002	0.002	0.00E+00
8/2/98	1	100.000	0.22836	0.007	0.000	0.00	0.002	0.002	0.00E+00
11/15/98	6580	0.200	1504.1293	44.459	1.259	0.00	11.982	10.784	0.00E+00
7/1/89	6640	0.200	1517.8448	44.865	1.270	0.00	12.091	10.882	0.00E+00
1/14/89	6860	0.200	1568.1348	46.351	1.313	0.00	12.492	11.243	0.00E+00
5/19/89	7130	0.200	1629.8544	48.176	1.364	0.00	12.983	11.685	0.00E+00
12/27/82	7540	0.200	1723.5768	50.946	1.443	0.10	13.730	12.357	1.37E-02
11/29/01	7840	0.100	1792.1541	52.973	1.500	0.00	14.276	12.849	0.00E+00
1/7/98	8610	0.100	1968.1692	58.176	1.647	0.00	15.678	14.111	0.00E+00
5/21/83	9070	0.100	2073.3211	61.284	1.735	0.00	16.516	14.864	0.00E+00
6/29/89	9670	0.100	2210.4758	65.338	1.850	0.00	17.609	15.848	0.00E+00
12/28/82	10200	0.100	2331.6290	68.919	1.952	0.00	18.574	16.716	0.00E+00
7/2/89	10700	0.100	2445.9246	72.297	2.047	0.00	19.484	17.536	0.00E+00
6/28/89	12100	0.100	2765.9521	81.757	2.315	0.10	22.034	19.830	2.20E-02
1/30/99	13900	0.000	3177.4160	93.919	2.660	0.00	25.311	22.780	0.00E+00

For brevity most of the cells in this spreadsheet have been hidden.

Table K-20. Existing TDS load and percent reduction for Little Sandy Creek (subsegment 101103) at Kisatchie, Louisiana (station 550)

Date	Observed Concentration (mg/L)	Flow/unit area on sampling day (cms/mi ²)	Percent exceedance for flow on sampling day	Current TDS load (tons/day)/mi ²	Reduced TDS load (tons/day)/mi ²	Allowable load with MOS incorporated (tons/day)/mi ²	Reduced load less than or equal to allow load?
7/13/81	386	0.022003074	23.7	8.083E-01	1.885E-01	1.885E-01	Yes
9/11/95	308	0.000956655	93.7	2.804E-02	6.538E-03	8.194E-03	Yes
8/12/91	290	0.027551676	19.6	7.604E-01	1.773E-01	2.360E-01	Yes
7/11/94	210	0.004591946	58.2	9.178E-02	2.140E-02	3.933E-02	Yes
11/13/90	200	0.002869966	69.7	5.463E-02	1.274E-02	2.458E-02	Yes
11/13/95	170	0.002869966	69.7	4.643E-02	1.083E-02	2.458E-02	Yes
9/8/86	154	0.001339318	88	1.963E-02	4.577E-03	1.147E-02	Yes
12/11/95	154	0.002869966	69.7	4.206E-02	9.808E-03	2.458E-02	Yes
8/13/90	153	0.00172198	82.5	2.507E-02	5.846E-03	1.475E-02	Yes
8/12/97	150	0.004400615	59.1	6.282E-02	1.465E-02	3.769E-02	Yes
1/12/98	148	0.071557824	9.2	1.008E+00	2.350E-01	6.129E-01	Yes
11/15/93	146	0.009375223	42.9	1.303E-01	3.037E-02	8.030E-02	Yes
1/11/94	146	0.004017953	61.1	5.583E-02	1.302E-02	3.442E-02	Yes
2/8/82	144	0.006696588	49.7	9.178E-02	2.140E-02	5.736E-02	Yes
10/12/92	144	0.001147986	91	1.573E-02	3.668E-03	9.833E-03	Yes
2/10/92	140	0.032526284	16.8	4.334E-01	1.010E-01	2.786E-01	Yes
11/14/88	139	0.003443959	64.8	4.556E-02	1.062E-02	2.950E-02	Yes
12/10/90	138	0.004591946	58.2	6.031E-02	1.406E-02	3.933E-02	Yes
6/13/94	72	0.007461912	47.6	5.113E-02	1.192E-02	6.392E-02	Yes
7/11/83	70	0.004209284	60.1	2.804E-02	6.538E-03	3.605E-02	Yes

For brevity most of the cells in this spreadsheet have been hidden.

5/14/90	64	0.102744791	7.1	6.258E-01	1.459E-01	8.801E-01	Yes
3/11/91	62	0.017793791	28.6	1.050E-01	2.448E-02	1.524E-01	Yes
6/12/95	62	0.006887919	49.2	4.064E-02	9.477E-03	5.900E-02	Yes
9/13/93	60	0.000765324	96	4.370E-03	1.019E-03	6.555E-03	Yes
9/10/84	59	0.001530649	85.1	8.595E-03	2.004E-03	1.311E-02	Yes
12/11/89	58	0.004591946	58.2	2.535E-02	5.910E-03	3.933E-02	Yes
3/12/90	57	0.017028466	29.8	9.238E-02	2.154E-02	1.459E-01	Yes
10/11/93	56	0.003252628	66.2	1.734E-02	4.042E-03	2.786E-02	Yes
11/14/94	56	0.007270581	48.2	3.875E-02	9.035E-03	6.228E-02	Yes
4/12/93	52	0.052998709	11.4	2.623E-01	6.116E-02	4.540E-01	Yes
4/8/96	50	0.007270581	48.2	3.460E-02	8.067E-03	6.228E-02	Yes
2/11/80	44	0.455367973	1.2	1.907E+00	4.446E-01	3.900E+00	Yes
1/14/91	44	0.052042054	11.5	2.179E-01	5.081E-02	4.458E-01	Yes
4/14/80	32	0.241077162	3.4	7.342E-01	1.712E-01	2.065E+00	Yes

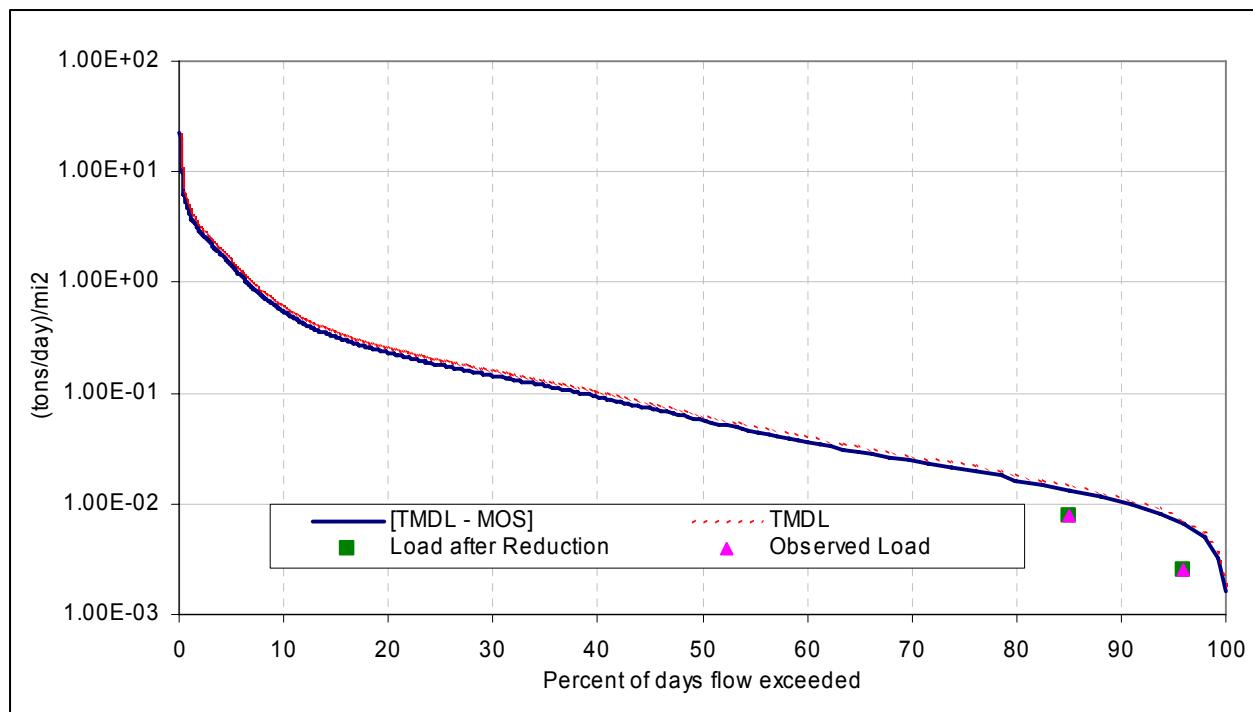


Figure K-11. TDS load duration curve for Kisatchie Bayou (subsegment 101103) at Kisatchie, Louisiana (station 549).

Table K-21. Allowable TDS load for Kisatchie Bayou (subsegment 101103) at Kisatchie, Louisiana (station 549)

Date	Observed flow (cfs)	Percent exceedance for observed flow	Adjusted flow for entire basin			Width for area under curves (%)	Allowable load to meet standard (tons/day)/mi ²	Target load with MOS incorporated (tons/day)/mi ²	Area under TMDL curve (tons/day/mi ²)
			cfs	cfs/mi ²	cms/mi ²				
7/12/98	1	100.000	0.2286	0.007	0.000	0.00	0.0018	0.0016	0.00E+00
7/13/98	1	100.000	0.2286	0.007	0.000	0.00	0.0018	0.0016	0.00E+00
7/14/98	1	100.000	0.2286	0.007	0.000	0.00	0.0018	0.0016	0.00E+00
7/23/98	1	100.000	0.2286	0.007	0.000	0.00	0.0018	0.0016	0.00E+00
7/24/98	1	100.000	0.2286	0.007	0.000	0.00	0.0018	0.0016	0.00E+00
7/25/98	1	100.000	0.2286	0.007	0.000	0.00	0.0018	0.0016	0.00E+00
7/27/98	1	100.000	0.2286	0.007	0.000	0.00	0.0018	0.0016	0.00E+00
7/29/98	1	100.000	0.2286	0.007	0.000	0.00	0.0018	0.0016	0.00E+00
7/30/98	1	100.000	0.2286	0.007	0.000	0.00	0.0018	0.0016	0.00E+00
7/31/98	1	100.000	0.2286	0.007	0.000	0.00	0.0018	0.0016	0.00E+00
8/1/98	1	100.000	0.2286	0.007	0.000	0.00	0.0018	0.0016	0.00E+00
8/2/98	1	100.000	0.2286	0.007	0.000	0.00	0.0018	0.0016	0.00E+00
11/15/98	6580	0.200	1504.1293	44.459	1.259	0.00	11.9819	10.7837	0.00E+00
7/1/89	6640	0.200	1517.8448	44.865	1.270	0.00	12.0911	10.8820	0.00E+00
1/14/89	6860	0.200	1568.1348	46.351	1.313	0.00	12.4918	11.2426	0.00E+00
5/19/89	7130	0.200	1629.8544	48.176	1.364	0.00	12.9834	11.6851	0.00E+00
12/27/82	7540	0.200	1723.5768	50.946	1.443	0.10	13.7300	12.3570	1.37E-02
11/29/01	7840	0.100	1792.1541	52.973	1.500	0.00	14.2763	12.8487	0.00E+00
1/7/98	8610	0.100	1968.1692	58.176	1.647	0.00	15.6784	14.1106	0.00E+00
5/21/83	9070	0.100	2073.3211	61.284	1.735	0.00	16.5161	14.8645	0.00E+00
6/29/89	9670	0.100	2210.4758	65.338	1.850	0.00	17.6086	15.8478	0.00E+00
12/28/82	10200	0.100	2331.6290	68.919	1.952	0.00	18.5738	16.7164	0.00E+00
7/2/89	10700	0.100	2445.9246	72.297	2.047	0.00	19.4842	17.5358	0.00E+00
6/28/89	12100	0.100	2765.9521	81.757	2.315	0.10	22.0336	19.8302	2.20E-02
1/30/99	13900	0.000	3177.4160	93.919	2.660	0.00	25.3113	22.7802	0.00E+00

For brevity most of the cells in this spreadsheet have been hidden.

Table K-22. Existing TDS load and percent reduction for Kisatchie Bayou (subsegment 101103) at Kisatchie, Louisiana (station 549)

Date	Observed Concentration (mg/L)	Flow/unit area on sampling day (cms/mi ²)	Percent exceedance for flow on sampling day	Current TDS load (tons/day)/mi ²	Reduced TDS load (tons/day)/mi ²	Allowable load with MOS incorporated (tons/day)/mi ²	Reduced load less than or equal to allow load?
11/18/96	68	0.001530649	85.1	9.891E-03	9.891E-03	1.311E-02	Yes
10/14/96	26	0.000765324	96.0	1.894E-03	1.894E-03	6.555E-03	Yes

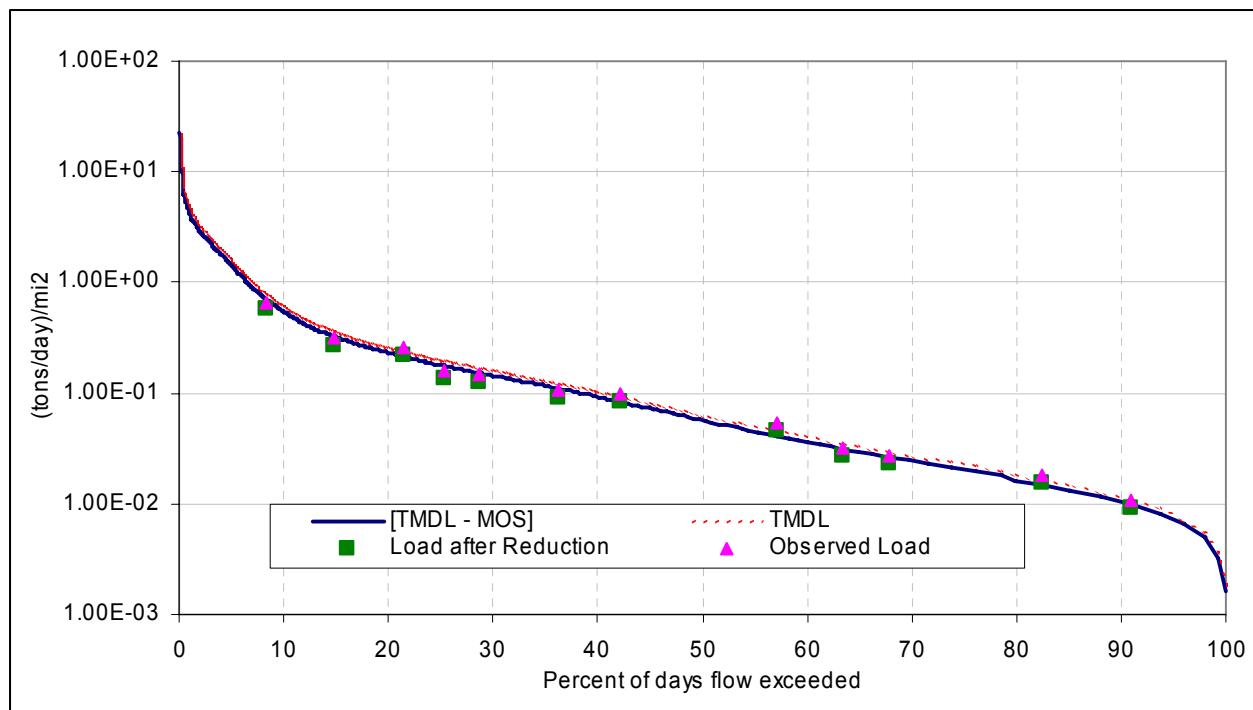
**Figure K-12. TDS load duration curve for Kisatchie Bayou (subsegment 101103) south of Cypress, Louisiana (station 1218).**

Table K-23. Allowable TDS load for Kisatchie Bayou (subsegment 101103) south of Cypress, Louisiana (station 1218)

Date	Observed flow (cfs)	Percent exceedance for observed flow	Adjusted flow for entire basin			Width for area under curves (%)	Allowable load to meet standard (tons/day)/mi ²	Target load with MOS incorporated (tons/day)/mi ²	Area under TMDL curve (tons/day/mi ²)
			cfs	cfs/mi ²	cms/mi ²				
7/12/98	1	100.000	0.22286	0.007	0.000	0.00	0.0018	0.0016	0.00E+00
7/13/98	1	100.000	0.22286	0.007	0.000	0.00	0.0018	0.0016	0.00E+00
7/14/98	1	100.000	0.22286	0.007	0.000	0.00	0.0018	0.0016	0.00E+00
7/23/98	1	100.000	0.22286	0.007	0.000	0.00	0.0018	0.0016	0.00E+00
7/24/98	1	100.000	0.22286	0.007	0.000	0.00	0.0018	0.0016	0.00E+00
7/25/98	1	100.000	0.22286	0.007	0.000	0.00	0.0018	0.0016	0.00E+00
7/27/98	1	100.000	0.22286	0.007	0.000	0.00	0.0018	0.0016	0.00E+00
7/29/98	1	100.000	0.22286	0.007	0.000	0.00	0.0018	0.0016	0.00E+00
7/30/98	1	100.000	0.22286	0.007	0.000	0.00	0.0018	0.0016	0.00E+00
7/31/98	1	100.000	0.22286	0.007	0.000	0.00	0.0018	0.0016	0.00E+00
8/1/98	1	100.000	0.22286	0.007	0.000	0.00	0.0018	0.0016	0.00E+00
8/2/98	1	100.000	0.22286	0.007	0.000	0.00	0.0018	0.0016	0.00E+00
11/15/98	6580	0.200	1504.1293	44.459	1.259	0.00	11.9819	10.7837	0.00E+00
7/1/89	6640	0.200	1517.8448	44.865	1.270	0.00	12.0911	10.8820	0.00E+00
1/14/89	6860	0.200	1568.1348	46.351	1.313	0.00	12.4918	11.2426	0.00E+00
5/19/89	7130	0.200	1629.8544	48.176	1.364	0.00	12.9834	11.6851	0.00E+00
12/27/82	7540	0.200	1723.5768	50.946	1.443	0.10	13.7300	12.3570	1.37E-02
11/29/01	7840	0.100	1792.1541	52.973	1.500	0.00	14.2763	12.8487	0.00E+00
1/7/98	8610	0.100	1968.1692	58.176	1.647	0.00	15.6784	14.1106	0.00E+00
5/21/83	9070	0.100	2073.3211	61.284	1.735	0.00	16.5161	14.8645	0.00E+00
6/29/89	9670	0.100	2210.4758	65.338	1.850	0.00	17.6086	15.8478	0.00E+00
12/28/82	10200	0.100	2331.6290	68.919	1.952	0.00	18.5738	16.7164	0.00E+00
7/2/89	10700	0.100	2445.9246	72.297	2.047	0.00	19.4842	17.5358	0.00E+00
6/28/89	12100	0.100	2765.9521	81.757	2.315	0.10	22.0336	19.8302	2.20E-02
1/30/99	13900	0.000	3177.4160	93.919	2.660	0.00	25.3113	22.7802	0.00E+00

For brevity most of the cells in this spreadsheet have been hidden.

Table K-24. Existing TDS load and percent reduction for Kisatchie Bayou (subsegment 101103) south of Cypress, Louisiana (station 1218)

Date	Observed Concentration (mg/L)	Flow/unit area on sampling day (cms/mi ²)	Percent exceedance for flow on sampling day	Current TDS load (tons/day)/mi ²	Reduced TDS load (tons/day)/mi ²	Allowable load with MOS incorporated (tons/day)/mi ²	Reduced load less than or equal to allow load?
11/18/96	54	0.001530649	85.1	7.867E-03	7.867E-03	1.311E-02	Yes
10/14/96	34	0.000765324	96.0	2.477E-03	2.477E-03	6.555E-03	Yes

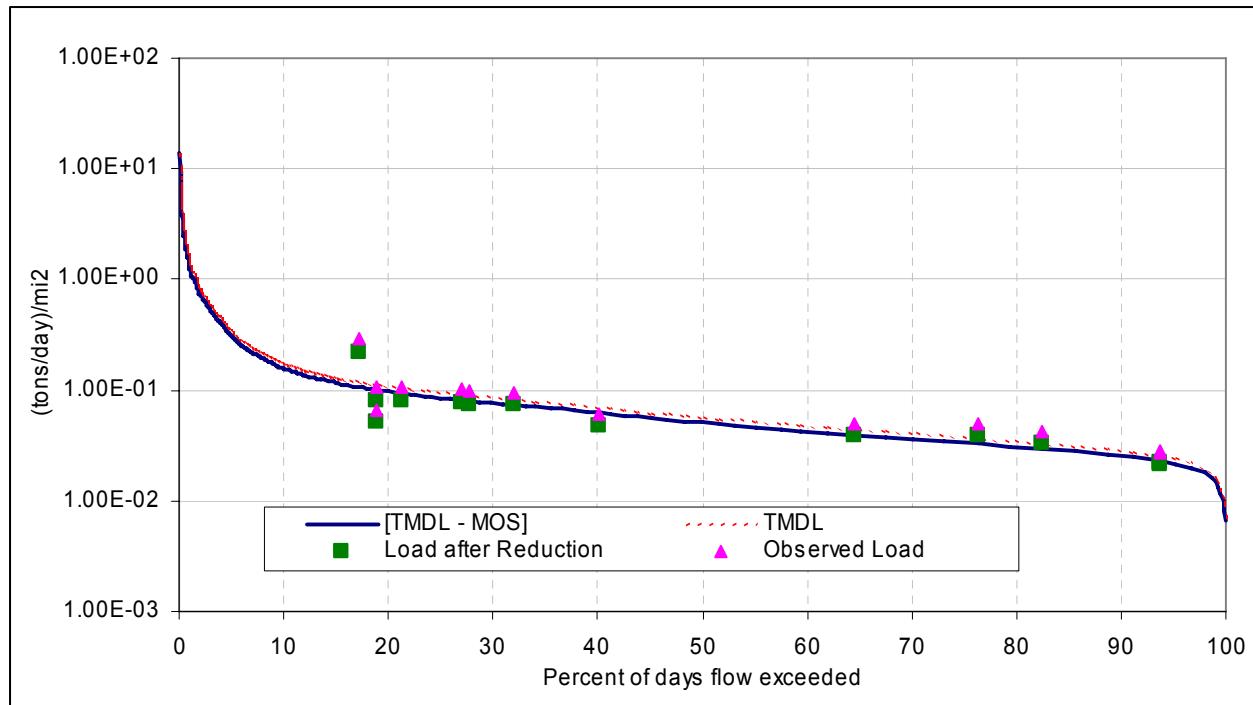
**Figure K-13. TDS load duration curve for Latt Creek (subsegment 101303) southeast of Latt, Louisiana (station 1222).**

Table K-25. Allowable TDS load for Iatt Creek (subsegment 101303) southeast of Iatt, Louisiana (station 1222)

Date	Observed flow (cfs)	Percent exceedance for observed flow	Adjusted flow for entire basin			Width for area under curves (%)	Allowable load to meet standard (tons/day)/mi ²	Target load with MOs incorporated (tons/day)/mi ²	Area under TMDL curve (tons/day/mi ²)
			cfs	cfs/mi ²	cms/mi ²				
8/30/00	4	100.000	0.9144	0.027	0.001	0.00	0.0073	0.0066	0.00E+00
8/31/00	4	100.000	0.9144	0.027	0.001	0.00	0.0073	0.0066	0.00E+00
9/1/00	4	100.000	0.9144	0.027	0.001	0.00	0.0073	0.0066	0.00E+00
9/2/00	4	100.000	0.9144	0.027	0.001	0.00	0.0073	0.0066	0.00E+00
9/3/00	4	100.000	0.9144	0.027	0.001	0.00	0.0073	0.0066	0.00E+00
9/4/00	4	100.000	0.9144	0.027	0.001	0.00	0.0073	0.0066	0.00E+00
9/5/00	4	100.000	0.9144	0.027	0.001	0.00	0.0073	0.0066	0.00E+00
9/6/00	4	100.000	0.9144	0.027	0.001	0.00	0.0073	0.0066	0.00E+00
9/7/00	4	100.000	0.9144	0.027	0.001	0.10	0.0073	0.0066	7.28E-06
8/14/00	5	99.900	1.1430	0.034	0.001	0.00	0.0091	0.0082	0.00E+00
8/15/00	5	99.900	1.1430	0.034	0.001	0.00	0.0091	0.0082	0.00E+00
8/19/00	5	99.900	1.1430	0.034	0.001	0.00	0.0091	0.0082	0.00E+00
For brevity most of the cells in this spreadsheet have been hidden.									
6/29/89	3040	0.200	694.9169	20.541	0.582	0.00	5.5357	4.9821	0.00E+00
5/18/89	3330	0.200	761.2083	22.500	0.637	0.00	6.0638	5.4574	0.00E+00
3/2/01	3410	0.200	779.4956	23.041	0.652	0.00	6.2095	5.5885	0.00E+00
11/29/01	3500	0.200	800.0688	23.649	0.670	0.10	6.3733	5.7360	6.37E-03
4/23/95	3760	0.100	859.5025	25.405	0.719	0.00	6.8468	6.1621	0.00E+00
12/27/82	3840	0.100	877.7898	25.946	0.735	0.00	6.9925	6.2932	0.00E+00
4/29/91	3840	0.100	877.7898	25.946	0.735	0.00	6.9925	6.2932	0.00E+00
12/26/82	3890	0.100	889.2193	26.284	0.744	0.00	7.0835	6.3752	0.00E+00
5/19/83	4410	0.100	1008.0867	29.797	0.844	0.00	8.0304	7.2274	0.00E+00
2/12/84	4870	0.100	1113.2386	32.905	0.932	0.00	8.8681	7.9813	0.00E+00
10/21/84	5390	0.100	1232.1059	36.419	1.031	0.00	9.8150	8.8935	0.00E+00
3/7/95	5650	0.100	1291.5396	38.176	1.081	0.10	10.2884	9.2596	1.03E-02
11/16/87	8610	0.000	1968.1692	58.176	1.647	0.00	15.6784	14.1106	0.00E+00

Table K-26. Existing TDS load and percent reduction for Iatt Creek (subsegment 101303) southeast of Iatt, Louisiana (station 1222)

Date	Observed Concentration (mg/L)	Flow/unit area on sampling day (cms/mi ²)	Percent exceedance for flow on sampling day	Current TDS load (tons/day)/mi ²	Reduced TDS load (tons/day)/mi ²	Allowable load with MOS incorporated (tons/day)/mi ²	Reduced load less than or equal to allow load?
10/21/02	246	0.01243652	17.1	2.912E-01	1.065E-01	1.065E-01	Yes
6/17/02	137	0.003826622	76.4	4.989E-02	1.825E-02	3.278E-02	Yes
9/23/02	131	0.003443959	82.4	4.294E-02	1.571E-02	2.950E-02	Yes
3/25/02	117	0.008609899	32.0	9.587E-02	3.508E-02	7.375E-02	Yes
5/20/02	115	0.004591946	64.6	5.026E-02	1.839E-02	3.933E-02	Yes
1/28/02	111	0.009566554	27.0	1.011E-01	3.697E-02	8.194E-02	Yes
7/22/02	111	0.002678635	93.7	2.830E-02	1.035E-02	2.294E-02	Yes
4/15/02	109	0.009375223	27.8	9.726E-02	3.558E-02	8.030E-02	Yes
8/19/02	107	0.002678635	93.7	2.720E-02	9.952E-03	2.294E-02	Yes
2/25/02	101	0.010905872	21.3	1.048E-01	3.835E-02	9.342E-02	Yes
12/16/02	96	0.011671196	18.9	1.066E-01	3.901E-02	9.997E-02	Yes
11/19/02	89	0.007270581	40.1	6.138E-02	2.246E-02	6.228E-02	Yes
12/16/02	59	0.011671196	18.9	6.587E-02	2.410E-02	9.997E-02	Yes

Appendix L

Load Duration Curve Summaries and Plots for Sulfate

Figure L-1. Sulfate load duration curve for unnamed tributary of Castor Creek (subsegment 100708) near Castor, Louisiana (station 1194)	2
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Table L-6. Existing sulfate load and percent reduction for unnamed tributary of Saline Bayou (subsegment 100804) near Arcadia, Louisiana (station 1206)	8

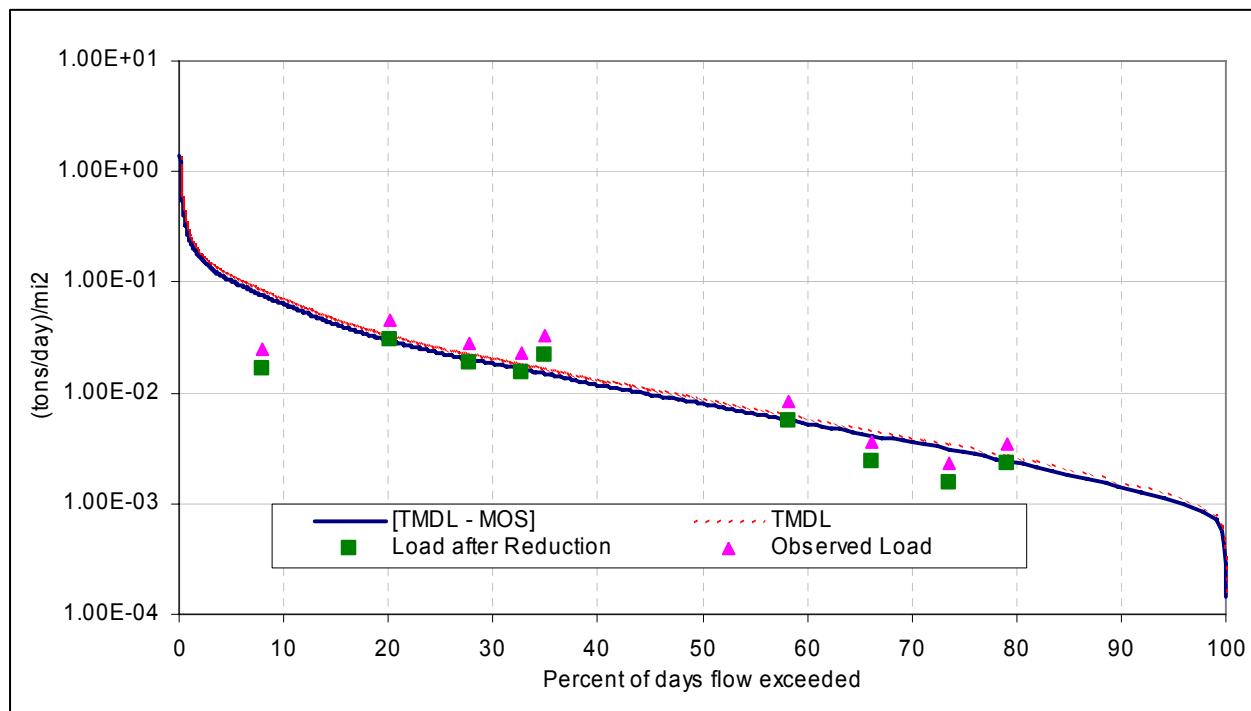


Figure L-1. Sulfate load duration curve for unnamed tributary of Castor Creek (subsegment 100708) near Castor, Louisiana (station 1194).

Table L-1. Allowable sulfate load for unnamed tributary of Castor Creek (subsegment 100708) near Castor, Louisiana (station 1194)

Date	Observed flow (cfs)	Percent exceedance for observed flow	Adjusted flow for entire basin			Width for area under curves (%)	Allowable load to meet standard (tons/day)/mi ²	Target load with MOS incorporated (tons/day)/mi ²	Area under TMDL curve (tons/day/mi ²)
			cfs	cfs*	cfs/mi ²				
8/3/00	1	100,000	0.0023	0.0797	0.223	0.006	0.0054	0.0049	0.00E+00
9/1/00	1	100,000	0.0023	0.0797	0.223	0.006	0.0054	0.0049	0.00E+00
9/6/00	1	100,000	0.0023	0.0797	0.223	0.006	0.0054	0.0049	0.00E+00
8/14/00	2	100,000	0.0046	0.0820	0.229	0.006	0.0056	0.0050	0.00E+00
8/15/00	2	100,000	0.0046	0.0820	0.229	0.006	0.0056	0.0050	0.00E+00
8/16/00	2	100,000	0.0046	0.0820	0.229	0.006	0.0056	0.0050	0.00E+00
8/17/00	2	100,000	0.0046	0.0820	0.229	0.006	0.0056	0.0050	0.00E+00
8/21/00	2	100,000	0.0046	0.0820	0.229	0.006	0.0056	0.0050	0.00E+00
8/22/00	2	100,000	0.0046	0.0820	0.229	0.006	0.0056	0.0050	0.00E+00
8/28/00	2	100,000	0.0046	0.0820	0.229	0.006	0.0056	0.0050	0.00E+00
8/29/00	2	100,000	0.0046	0.0820	0.229	0.006	0.0056	0.0050	0.00E+00
8/30/00	2	100,000	0.0046	0.0820	0.229	0.006	0.0056	0.0050	0.00E+00
6/30/89	5930	0.100	13.7826	13.8599	38.723	1.097	0.00	0.9392	0.8453
3/8/95	5950	0.100	13.8290	13.9064	38.853	1.100	0.00	0.9424	0.8481
7/2/89	6040	0.100	14.0382	14.1156	39.437	1.117	0.00	0.9565	0.8609
5/6/89	6060	0.100	14.0847	14.1621	39.567	1.120	0.00	0.9597	0.8637
7/1/89	6200	0.100	14.4101	14.4874	40.476	1.146	0.00	0.9817	0.8836
1/3/99	6370	0.100	14.8052	14.8826	41.580	1.177	0.00	1.0085	0.9077
4/30/91	6420	0.100	14.9214	14.9988	41.904	1.187	0.00	1.0164	0.9148
2/20/91	6660	0.100	15.4792	15.5566	43.463	1.231	0.00	1.0542	0.9488
12/28/82	6720	0.100	15.6187	15.6960	43.853	1.242	0.00	1.0636	0.9573
12/13/01	6970	0.100	16.1997	16.2771	45.476	1.288	0.00	1.1030	0.9927
5/19/89	8050	0.100	18.7099	18.7872	52.489	1.486	0.00	1.2731	1.1458
1/30/99	8590	0.100	19.9649	20.0423	55.995	1.586	0.10	1.3582	1.2224
4/23/95	9730	0.000	22.6145	22.6919	63.398	1.795	0.00	1.5377	1.3840

For brevity most of the cells in this spreadsheet have been hidden.

* Flow was adjusted to include WTP flow as watershed was too small.

Table L-2. Existing sulfate load and percent reduction for unnamed tributary of Castor Creek (subsegment 100708) near Castor, Louisiana (station 1194)

Date	Observed Concentration (mg/L)	Flow/unit area on sampling day (cms/mi ²)	Percent exceedance for flow on sampling day	Current Sulfate load (tons/day)/mi ²	Reduced Sulfate load (tons/day)/mi ²	Allowable load with MOS incorporated (tons/day)/mi ²	Reduced load less than or equal to allow load?
12/9/02	18	0.019307045	34.9	3.271E-02	1.488E-02	1.488E-02	Yes
3/18/02	12	0.038430214	20.1	4.535E-02	2.064E-02	2.963E-02	Yes
11/12/02	12	0.007355065	58.2	8.400E-03	3.822E-03	5.670E-03	Yes
7/15/02	11	0.003125903	79.2	3.392E-03	1.543E-03	2.410E-03	Yes
1/14/02	11	0.021145812	32.8	2.274E-02	1.035E-02	1.630E-02	Yes
2/18/02	11	0.026110481	27.7	2.783E-02	1.267E-02	2.013E-02	Yes
5/13/02	7	0.005332422	66.2	3.553E-03	1.617E-03	4.111E-03	Yes
6/10/02	6	0.004045286	73.6	2.272E-03	1.034E-03	3.119E-03	Yes
4/8/02	3	0.098557870	8.0	2.439E-02	1.110E-02	7.598E-02	Yes

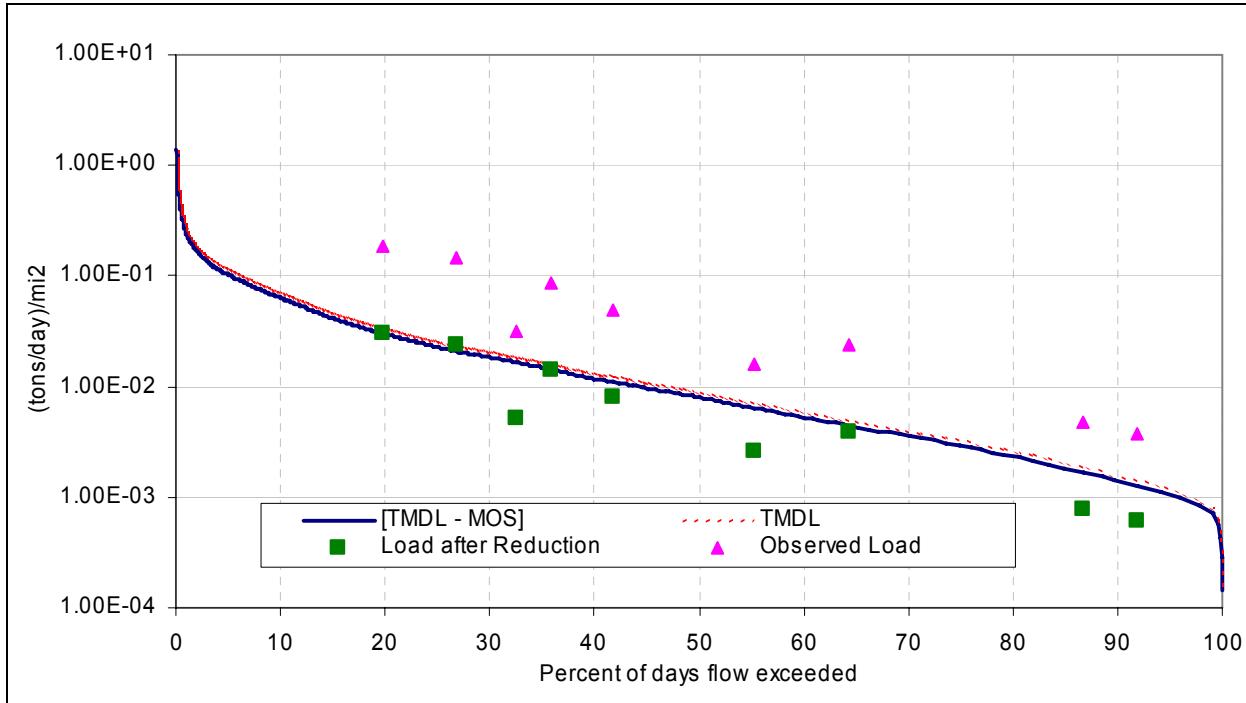
**Figure L-2. Sulfate load duration curve for unnamed tributary of Grand Bayou (subsegment 100710) near Hall Summit, Louisiana (station 1195).**

Table L-3. Allowable sulfate load for unnamed tributary of Grand Bayou (subsegment 100710) near Hall Summit, Louisiana (station 1195)

Date	Observed flow (cfs)	Percent exceedance for observed flow	Adjusted flow for entire basin			Width for area under curves (%)	Allowable load to meet standard (tons/day)/mi ²	Target load with MOS incorporated (tons/day)/mi ²	Area under TMDL curve (tons/day/mi ²)
			cfs	cfs*	cfs/mi ²				
8/31/00	1	100,000	0.00005	0.07778	1.085	0.031	0.00	0.0263	0.0237
9/1/00	1	100,000	0.00005	0.07778	1.085	0.031	0.00	0.0263	0.0237
9/6/00	1	100,000	0.00005	0.07778	1.085	0.031	0.00	0.0263	0.0237
8/14/00	2	100,000	0.00009	0.0783	1.091	0.031	0.00	0.0265	0.0238
8/15/00	2	100,000	0.00009	0.0783	1.091	0.031	0.00	0.0265	0.0238
8/16/00	2	100,000	0.00009	0.0783	1.091	0.031	0.00	0.0265	0.0238
8/17/00	2	100,000	0.00009	0.0783	1.091	0.031	0.00	0.0265	0.0238
8/21/00	2	100,000	0.00009	0.0783	1.091	0.031	0.00	0.0265	0.0238
8/22/00	2	100,000	0.00009	0.0783	1.091	0.031	0.00	0.0265	0.0238
8/28/00	2	100,000	0.00009	0.0783	1.091	0.031	0.00	0.0265	0.0238
8/29/00	2	100,000	0.00009	0.0783	1.091	0.031	0.00	0.0265	0.0238
8/30/00	2	100,000	0.00009	0.0783	1.091	0.031	0.00	0.0265	0.0238
6/30/89	5930	0.100	2.7633	2.8406	39.585	1.121	0.00	0.9601	0.8641
3/8/95	5950	0.100	2.7726	2.8499	39.714	1.125	0.00	0.9633	0.8670
7/2/89	6040	0.100	2.8145	2.8919	40.299	1.141	0.00	0.9775	0.8797
5/6/89	6060	0.100	2.8238	2.9012	40.429	1.145	0.00	0.9806	0.8825
7/1/89	6200	0.100	2.8891	2.9664	41.338	1.171	0.00	1.0027	0.9024
1/31/99	6370	0.100	2.9683	3.0457	42.442	1.202	0.00	1.0294	0.9265
4/30/91	6420	0.100	2.9916	3.0690	42.766	1.211	0.00	1.0373	0.9336
2/20/91	6660	0.100	3.1034	3.1808	44.325	1.255	0.00	1.0751	0.9676
12/28/82	6720	0.100	3.1314	3.2088	44.714	1.266	0.00	1.0846	0.9761
12/13/01	6970	0.100	3.2479	3.3252	46.338	1.312	0.00	1.1239	1.0115
5/19/89	8050	0.100	3.7511	3.8285	53.351	1.511	0.00	1.2940	1.1646
1/30/99	8590	0.100	4.0028	4.0801	56.857	1.610	0.10	1.3791	1.2412
4/23/95	9730	0.000	4.5340	4.6114	64.260	1.820	0.00	1.5586	1.4028

For brevity most of the cells in this spreadsheet have been hidden.

* Flow was adjusted to include WTP flow as watershed was too small.

Table L-4. Existing sulfate load and percent reduction for unnamed tributary of Grand Bayou (subsegment 100710) near Hall Summit, Louisiana (station 1195)

Date	Observed Concentration (mg/L)	Flow/unit area on sampling day (cms/mi ²)	Percent exceedance for flow on sampling day	Current Sulfate load (tons/day)/mi ²	Reduced Sulfate load (tons/day)/mi ²	Allowable load with MOS incorporated (tons/day)/mi ²	Reduced load less than or equal to allow load?
2/19/02	57	0.027029864	26.8	1.474E-01	2.084E-02	2.084E-02	Yes
3/19/02	50	0.039533474	19.7	1.881E-01	2.659E-02	3.048E-02	Yes
1/15/02	50	0.018571539	35.8	8.785E-02	1.242E-02	1.432E-02	Yes
5/14/02	45	0.005700175	64.4	2.414E-02	3.413E-03	4.394E-03	Yes
12/10/02	36	0.014342377	41.7	4.928E-02	6.966E-03	1.106E-02	Yes
8/5/02	24	0.001654890	91.8	3.764E-03	5.321E-04	1.276E-03	Yes
7/9/02	23	0.002206519	86.6	4.767E-03	6.739E-04	1.701E-03	Yes
11/19/02	20	0.008274448	55.3	1.607E-02	2.271E-03	6.379E-03	Yes
6/11/02	16	0.021329688	32.6	3.167E-02	4.477E-03	1.644E-02	Yes

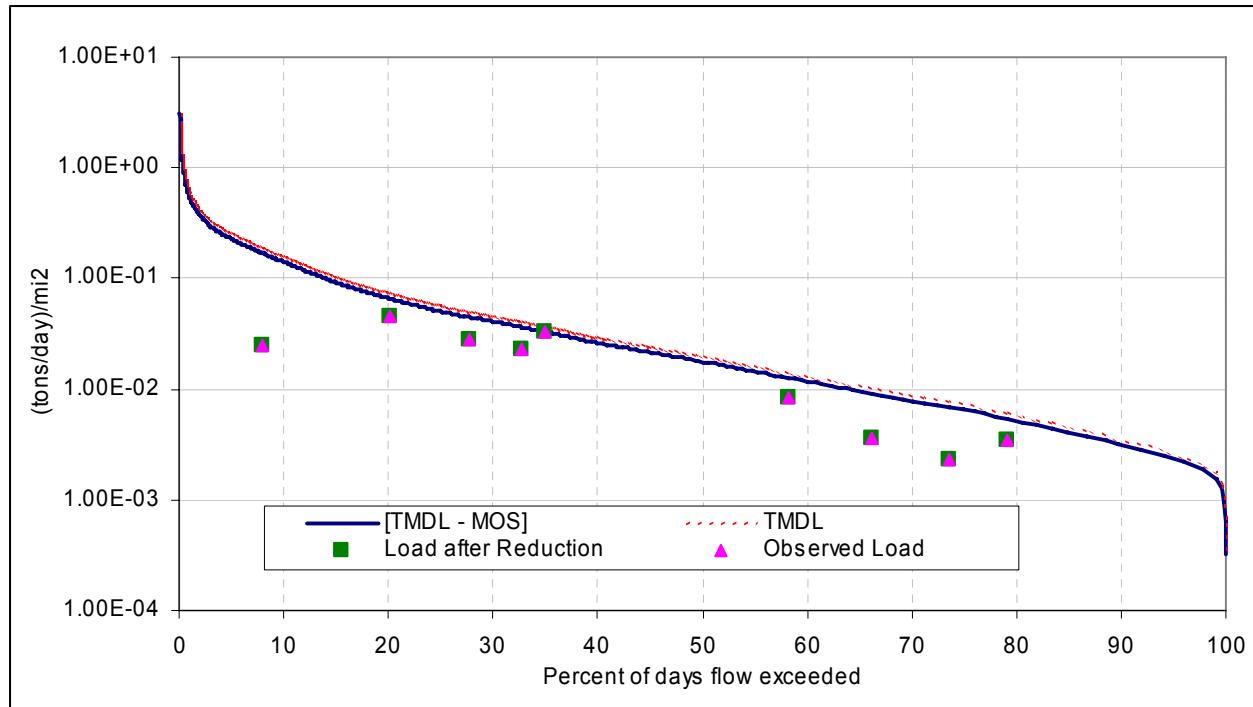
**Figure L-3. Sulfate load duration curve for unnamed tributary of Saline Bayou (subsegment 100804) near Arcadia, Louisiana (station 1206).**

Table L-5. Allowable sulfate load for unnamed tributary of Saline Bayou (subsegment 100804) near Arcadia, Louisiana (station 1206)

Date	Observed flow (cfs)	Percent exceedance for observed flow	Adjusted flow for entire basin			Width for area under curves (%)	Allowable load to meet standard (tons/day)/mi ²	Target load with MOs incorporated (tons/day)/mi ²	Area under TMDL curve (tons/day/mi ²)
			cfs	cfs*	cfs/mi ²				
8/31/00	1	100,000	0.0015	0.7752	3.273	0.093	0.00	0.1764	0.1588
9/1/00	1	100,000	0.0015	0.7752	3.273	0.093	0.00	0.1764	0.1588
9/6/00	1	100,000	0.0015	0.7752	3.273	0.093	0.00	0.1764	0.1588
8/14/00	2	100,000	0.0031	0.7767	3.279	0.093	0.00	0.1768	0.1591
8/15/00	2	100,000	0.0031	0.7767	3.279	0.093	0.00	0.1768	0.1591
8/16/00	2	100,000	0.0031	0.7767	3.279	0.093	0.00	0.1768	0.1591
8/17/00	2	100,000	0.0031	0.7767	3.279	0.093	0.00	0.1768	0.1591
8/21/00	2	100,000	0.0031	0.7767	3.279	0.093	0.00	0.1768	0.1591
8/22/00	2	100,000	0.0031	0.7767	3.279	0.093	0.00	0.1768	0.1591
8/28/00	2	100,000	0.0031	0.7767	3.279	0.093	0.00	0.1768	0.1591
8/29/00	2	100,000	0.0031	0.7767	3.279	0.093	0.00	0.1768	0.1591
8/30/00	2	100,000	0.0031	0.7767	3.279	0.093	0.00	0.1768	0.1591
For brevity most of the cells in this spreadsheet have been hidden.									
6/30/89	5930	0.100	9.1198	9.8934	41.773	1.183	0.00	2.2516	2.0264
3/8/95	5950	0.100	9.1505	9.9241	41.903	1.187	0.00	2.2586	2.0327
7/2/89	6040	0.100	9.2889	10.0625	42.487	1.203	0.00	2.2901	2.0611
5/6/89	6060	0.100	9.3197	10.0933	42.617	1.207	0.00	2.2971	2.0674
7/1/89	6200	0.100	9.5350	10.3086	43.526	1.233	0.00	2.3461	2.1115
1/31/99	6370	0.100	9.7964	10.5700	44.630	1.264	0.00	2.4056	2.1650
4/30/91	6420	0.100	9.8733	10.6469	44.955	1.273	0.00	2.4231	2.1808
2/20/91	6660	0.100	10.2424	11.0160	46.513	1.317	0.00	2.5071	2.2564
12/28/82	6720	0.100	10.3347	11.1083	46.903	1.328	0.00	2.5281	2.2753
12/13/01	6970	0.100	10.7192	11.4928	48.526	1.374	0.00	2.6156	2.3540
5/19/89	8050	0.100	12.3801	13.1537	55.539	1.573	0.00	2.9936	2.6942
1/30/99	8590	0.100	13.2106	13.9842	59.046	1.672	0.10	3.1826	2.8643
4/23/95	9730	0.000	14.9638	15.7374	66.448	1.882	0.00	3.5816	3.2234

* Flow was adjusted to include WTP flow as watershed was too small.

Table L-6. Existing sulfate load and percent reduction for unnamed tributary of Saline Bayou (subsegment 100804) near Arcadia, Louisiana (station 1206)

Date	Observed Concentration (mg/L)	Flow/unit area on sampling day (cms/mi ²)	Percent exceedance for flow on sampling day	Current Sulfate load (tons/day)/mi ²	Reduced Sulfate load (tons/day)/mi ²	Allowable load with MOS incorporated (tons/day)/mi ²	Reduced load less than or equal to allow load?
12/9/02	18	0.019307045	34.9	3.271E-02	3.271E-02	3.308E-02	Yes
3/18/02	12	0.038430214	20.1	4.535E-02	4.535E-02	6.584E-02	Yes
11/12/02	12	0.007355065	58.2	8.400E-03	8.400E-03	1.260E-02	Yes
7/15/02	11	0.003125903	79.2	3.392E-03	3.392E-03	5.355E-03	Yes
1/14/02	11	0.021145812	32.8	2.274E-02	2.274E-02	3.623E-02	Yes
2/18/02	11	0.026110481	27.7	2.783E-02	2.783E-02	4.473E-02	Yes
5/13/02	7	0.005332422	66.2	3.553E-03	3.553E-03	9.135E-03	Yes
6/10/02	6	0.004045286	73.6	2.272E-03	2.272E-03	6.930E-03	Yes
4/8/02	3	0.098557870	8.0	2.439E-02	2.439E-02	1.688E-01	Yes

Appendix M

Load Duration Curve Summaries and Plots for Fecal Coliform Bacteria: Summer

Figure M-1. Summer fecal coliform bacteria load duration curve for Kelly Bayou (subsegment 100306) at Huckaby Road, south of Hosston, Louisiana (station 1192)	3
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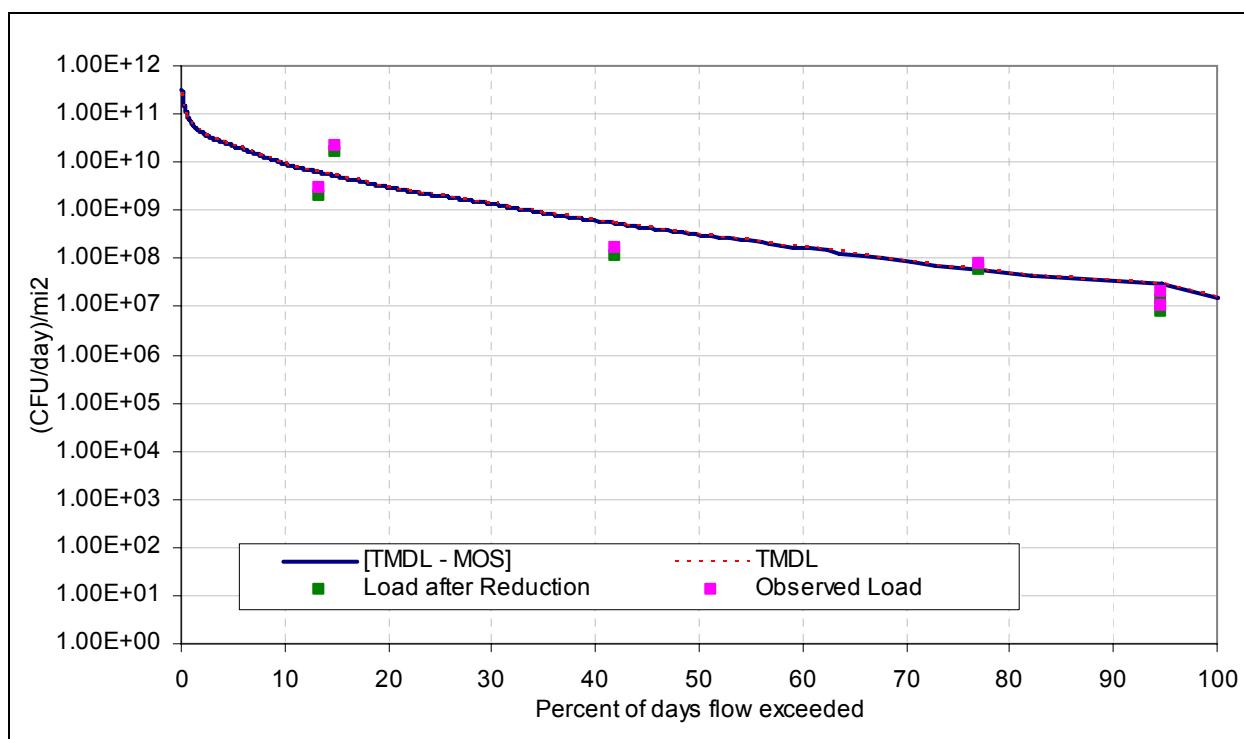


Figure M-1. Summer fecal coliform bacteria load duration curve for Kelly Bayou (subsegment 100306) at Huckaby Road, south of Hosston, Louisiana (station 1192).

Table M-1. Summer allowable fecal coliform load for Kelly Bayou (subsegment 100306) at Huckaby Road, south of Hosston, Louisiana (station 1192)

Season	Date	Observed flow (cfs)	Percent exceedance for observed flow	Adjusted flow for entire basin			Width for area under curves (%)	Allowable load to meet standard (CFU/day)/mi ²	Target load with MOS incorporated (CFU/day)/mi ²	Area under TMDL curve (CFU/day/mi ²)
				cfs	cfs/mi ²	cms/mi ²				4.72E+09
Summer	8/24/62	1	100.000	0.0076	0.002	0.000	0.00	16171989.9399	14554790.9459	0.00E+00
Summer	8/25/62	1	100.000	0.0076	0.002	0.000	0.00	16171989.9399	14554790.9459	0.00E+00
Summer	8/26/62	1	100.000	0.0076	0.002	0.000	0.00	16171989.9399	14554790.9459	0.00E+00
Summer	8/27/62	1	100.000	0.0076	0.002	0.000	0.00	16171989.9399	14554790.9459	0.00E+00
Summer	8/28/62	1	100.000	0.0076	0.002	0.000	0.00	16171989.9399	14554790.9459	0.00E+00
Summer	8/29/62	1	100.000	0.0076	0.002	0.000	0.00	16171989.9399	14554790.9459	0.00E+00
Summer	8/24/63	1	100.000	0.0076	0.002	0.000	0.00	16171989.9399	14554790.9459	0.00E+00
Summer	8/25/63	1	100.000	0.0076	0.002	0.000	0.00	16171989.9399	14554790.9459	0.00E+00
Summer	8/26/63	1	100.000	0.0076	0.002	0.000	0.00	16171989.9399	14554790.9459	0.00E+00
Summer	8/27/63	1	100.000	0.0076	0.002	0.000	0.00	16171989.9399	14554790.9459	0.00E+00
Summer	8/28/63	1	100.000	0.0076	0.002	0.000	0.00	16171989.9399	14554790.9459	0.00E+00
Summer	8/29/63	1	100.000	0.0076	0.002	0.000	0.00	16171989.9399	14554790.9459	0.00E+00
Summer	5/2/66	10700	0.200	81.5239	17.686	0.501	0.00	173040292357.2180	155736263121.4960	0.00E+00
Summer	5/2/91	10800	0.200	82.2858	17.851	0.505	0.00	174657491351.2100	157191742216.0890	0.00E+00
Summer	5/4/66	10900	0.200	83.0477	18.017	0.510	0.00	176274690345.2030	15886477221310.6830	0.00E+00
Summer	5/6/91	11000	0.200	83.8096	18.182	0.515	0.00	177891889339.1960	160102700405.2760	0.00E+00
Summer	10/16/01	11000	0.200	83.8096	18.182	0.515	0.10	177891889339.1960	160102700405.2760	1.78E+08
Summer	5/5/91	11100	0.100	84.5715	18.347	0.520	0.00	179509088333.1880	161558179499.8690	0.00E+00
Summer	5/3/66	12200	0.100	92.9524	20.165	0.571	0.00	197298277267.1080	177568449540.3970	0.00E+00
Summer	10/15/01	13000	0.100	99.0477	21.488	0.608	0.00	210235869219.0490	189212282297.1440	0.00E+00
Summer	10/14/01	13500	0.100	102.8572	22.314	0.632	0.00	218321864189.0130	196489677770.1120	0.00E+00
Summer	5/1/91	17000	0.100	129.5239	28.099	0.796	0.00	274923828978.7570	247431446080.8810	0.00E+00
Summer	6/11/74	17400	0.100	132.5715	28.760	0.814	0.00	281392624954.7280	253253362459.2550	0.00E+00
Summer	6/9/74	20400	0.100	155.4287	33.719	0.955	0.10	3289085594774.5080	29891735297.0570	3.30E+08
Summer	6/10/74	21900	0.000	166.8573	36.198	1.025	0.00	354166579684.3990	318749921715.9590	0.00E+00

For brevity most of the cells in this spreadsheet have been hidden.

Table M-2. Summer existing fecal coliform load and percent reduction for Kelly Bayou (subsegment 100306) at Huckaby Road, south of Hosston, Louisiana (station 1192)

Season	Date	Obs FC (CFU/100mL)	Flow/unit area on sampling day (cms/mi ²)	Percent exceedance for flow on sampling day	Current fecal coliform load (CFU/day)/mi ²	Reduced fecal coliform load (CFU/day)/mi ²	Allowable load with MOS incorporated (CFU/day)/mi ²	Reduced load less than or equal to allow load?
Summer	6/3/02	1600	0.016381736	14.9	2.264E+10	1.630E+10	5.094E+09	No
Summer	8/13/02	500	0.000187220	77.1	8.086E+07	5.822E+07	5.822E+07	Yes
Summer	9/9/02	240	0.000093610	94.5	1.941E+07	1.397E+07	2.911E+07	Yes
Summer	5/6/02	170	0.019658083	13.3	2.887E+09	2.078E+09	6.113E+09	Yes
Summer	10/7/02	130	0.000093610	94.5	1.051E+07	7.568E+06	2.911E+07	Yes
Summer	7/8/02	110	0.001731783	41.9	1.645E+08	1.185E+08	5.385E+08	Yes

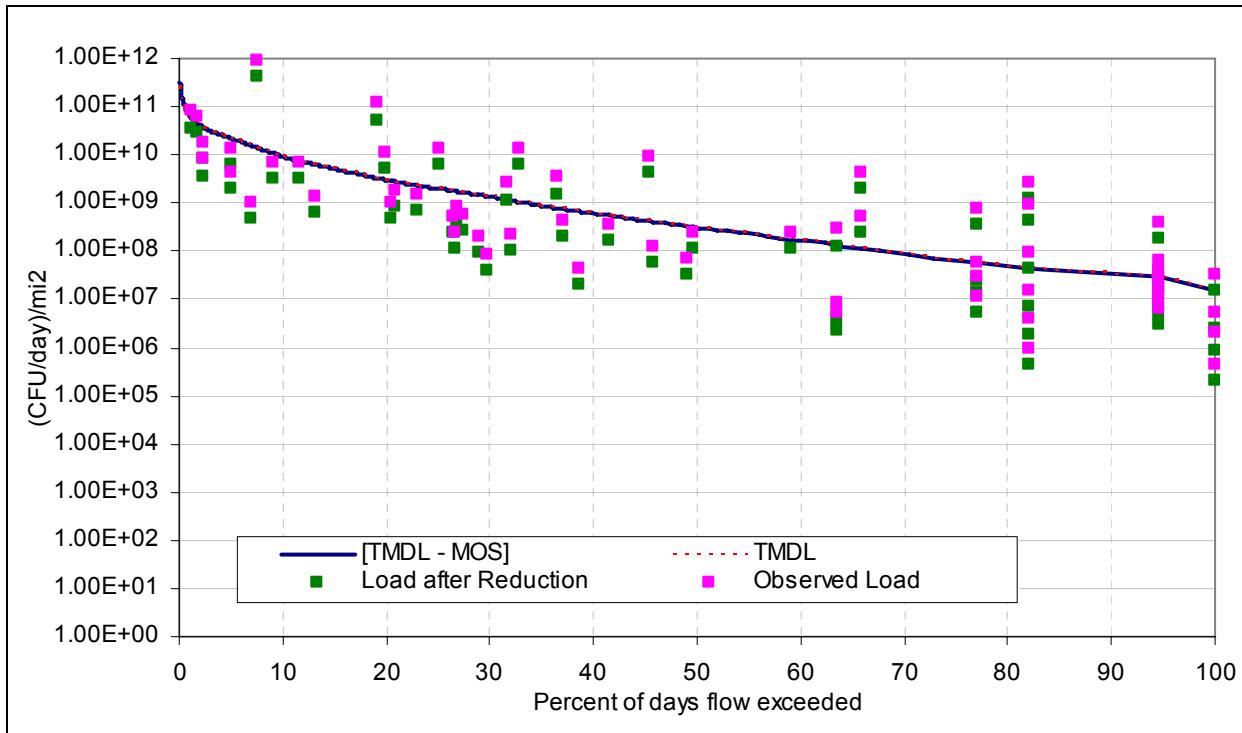
**Figure M-2. Summer fecal coliform bacteria load duration curve for Kelly Bayou (subsegment 100306) near Hosston, Louisiana (station 56).**

Table M-3. Summer allowable fecal coliform load for Kelly Bayou (subsegment 100306) near Hosston, Louisiana (station 56)

Season	Date	Observed flow (cfs)	Percent exceedance for observed flow	Adjusted flow for entire basin			Width for area under curves (%)	Allowable load to meet standard (CFU/day)/mi ²	Target load with MOS incorporated (CFU/day)/mi ²	Area under TMDL curve (CFU/day/mi ²)
				cfs	cfs/mi ²	cms/mi ²				
Summer	8/24/62	1	100.000	0.0076	0.002	0.000	0.00	16171989.9399	14554790.9459	4.72E+09
Summer	8/25/62	1	100.000	0.0076	0.002	0.000	0.00	16171989.9399	14554790.9459	0.00E+00
Summer	8/26/62	1	100.000	0.0076	0.002	0.000	0.00	16171989.9399	14554790.9459	0.00E+00
Summer	8/27/62	1	100.000	0.0076	0.002	0.000	0.00	16171989.9399	14554790.9459	0.00E+00
Summer	8/28/62	1	100.000	0.0076	0.002	0.000	0.00	16171989.9399	14554790.9459	0.00E+00
Summer	8/29/62	1	100.000	0.0076	0.002	0.000	0.00	16171989.9399	14554790.9459	0.00E+00
Summer	8/24/63	1	100.000	0.0076	0.002	0.000	0.00	16171989.9399	14554790.9459	0.00E+00
Summer	8/25/63	1	100.000	0.0076	0.002	0.000	0.00	16171989.9399	14554790.9459	0.00E+00
Summer	8/26/63	1	100.000	0.0076	0.002	0.000	0.00	16171989.9399	14554790.9459	0.00E+00
Summer	8/27/63	1	100.000	0.0076	0.002	0.000	0.00	16171989.9399	14554790.9459	0.00E+00
Summer	8/28/63	1	100.000	0.0076	0.002	0.000	0.00	16171989.9399	14554790.9459	0.00E+00
Summer	8/29/63	1	100.000	0.0076	0.002	0.000	0.00	16171989.9399	14554790.9459	0.00E+00
Summer	5/2/66	10700	0.200	81.5239	17.686	0.501	0.00	173040292357.2180	155736263121.4960	0.00E+00
Summer	5/2/91	10800	0.200	82.2858	17.851	0.505	0.00	1746574913561.2100	157191742216.0890	0.00E+00
Summer	5/4/66	10900	0.200	83.0477	18.017	0.510	0.00	176274690345.2030	158647221310.6830	0.00E+00
Summer	5/6/91	11000	0.200	83.8096	18.182	0.515	0.10	177891889339.1960	160102700405.2760	0.00E+00
Summer	10/16/01	11000	0.200	83.8096	18.182	0.515	0.10	177891889339.1960	160102700405.2760	1.78E+08
Summer	5/5/91	11100	0.100	84.5715	18.347	0.520	0.00	179509088333.1880	161558179499.8690	0.00E+00
Summer	5/3/66	12200	0.100	92.9524	20.165	0.571	0.00	197298277267.1080	17756449540.3970	0.00E+00
Summer	10/15/01	13000	0.100	99.0477	21.488	0.608	0.00	210235869219.0490	189212282297.1440	0.00E+00
Summer	10/14/01	13500	0.100	102.8572	22.314	0.632	0.00	218321864189.0130	196489677770.1120	0.00E+00
Summer	5/1/91	17000	0.100	129.5239	28.099	0.796	0.00	274923828978.7570	247431446080.8810	0.00E+00
Summer	6/11/74	17400	0.100	132.5715	28.760	0.814	0.00	281392624954.7280	25323362459.2550	0.00E+00
Summer	6/9/74	20400	0.100	155.4287	33.719	0.955	0.10	328908594774.5080	29691735297.0570	3.30E+08
Summer	6/10/74	21900	0.000	166.8573	36.198	1.025	0.00	354166579684.3990	318749921715.9590	0.00E+00

For brevity most of the cells in this spreadsheet have been hidden.

Table M-4. Summer existing fecal coliform load and percent reduction for Kelly Bayou (subsegment 100306) near Hosston, Louisiana (station 56)

Season	Date	Obs FC (CFU/100mL)	Flow/unit area on sampling day (cms/mi ²)	Percent exceedance for flow on sampling day	Current fecal coliform load (CFU/day)/mi ²	Reduced fecal coliform load (CFU/day)/mi ²	Allowable load with MOS incorporated (CFU/day)/mi ²	Reduced load less than or equal to allow load?
Summer	5/8/78	24000	0.045447615	7.5	9.422E+11	4.293E+11	1.413E+10	No
Summer	7/11/88	22000	0.000140415	82.1	2.668E+09	1.216E+09	4.366E+07	No
Summer	5/11/81	13000	0.010531116	19.1	1.183E+11	5.388E+10	3.275E+09	No
Summer	8/9/82	13000	0.000374440	65.8	4.205E+09	1.916E+09	1.164E+08	No
Summer	9/12/88	8000	0.000140415	82.1	9.703E+08	4.421E+08	4.366E+07	No
Summer	6/8/87	7900	0.001357344	45.3	9.263E+09	4.220E+09	4.221E+08	No
Summer	10/10/88	5000	0.000093610	94.5	4.043E+08	1.842E+08	2.911E+07	No
Summer	10/13/86	4900	0.003323152	32.9	1.407E+10	6.408E+09	1.033E+09	No
Summer	8/10/87	4900	0.000187220	77.1	7.924E+08	3.610E+08	5.822E+07	No
Summer	10/8/84	2400	0.006365474	25.0	1.320E+10	6.012E+09	1.979E+09	No
Summer	10/9/89	1700	0.000374440	65.8	5.498E+08	2.505E+08	1.164E+08	No
Summer	8/13/84	1600	0.002480663	36.5	3.428E+09	1.562E+09	7.714E+08	No
Summer	6/9/80	1300	0.009735431	19.9	1.093E+10	4.981E+09	3.027E+09	No
Summer	10/11/82	790	0.000093610	94.5	6.388E+07	2.910E+07	2.911E+07	Yes
Summer	9/8/86	790	0.003744397	31.7	2.555E+09	1.164E+09	1.164E+09	Yes
Summer	7/13/87	790	0.000421245	63.6	2.875E+08	1.310E+08	1.310E+08	Yes
Summer	10/12/87	790	0.000046805	100.0	3.194E+07	1.455E+07	1.455E+07	Yes
Summer	6/13/88	790	0.000140415	82.1	9.582E+07	4.366E+07	4.366E+07	Yes
Summer	5/8/89	500	0.143223174	1.8	6.186E+10	2.818E+10	4.454E+10	Yes
Summer	6/12/89	500	0.185815686	1.1	8.025E+10	3.656E+10	5.778E+10	Yes
Summer	6/10/85	490	0.000561660	59.1	2.377E+08	1.083E+08	1.747E+08	Yes
Summer	8/12/85	490	0.000093610	94.5	3.962E+07	1.805E+07	2.911E+07	Yes
Summer	10/14/85	490	0.000093610	94.5	3.962E+07	1.805E+07	2.911E+07	Yes
Summer	9/10/84	350	0.000187220	77.1	5.660E+07	2.579E+07	5.822E+07	Yes
Summer	6/12/78	330	0.023870529	11.5	6.804E+09	3.100E+09	7.423E+09	Yes
Summer	9/14/87	330	0.000093610	94.5	2.668E+07	1.216E+07	2.911E+07	Yes
Summer	7/9/79	280	0.001029709	49.7	2.490E+08	1.135E+08	3.202E+08	Yes
Summer	6/11/79	230	0.070207438	5.1	1.395E+10	6.355E+09	2.183E+10	Yes
Summer	7/13/81	230	0.035150524	9.0	6.983E+09	3.182E+09	1.093E+10	Yes
Summer	10/12/81	230	0.001778588	41.5	3.534E+08	1.610E+08	5.531E+08	Yes
Summer	5/10/82	230	0.008939747	20.9	1.776E+09	8.092E+08	2.780E+09	Yes
Summer	5/12/87	230	0.007395183	23.0	1.469E+09	6.694E+08	2.300E+09	Yes
Summer	9/12/83	220	0.000093610	94.5	1.779E+07	8.105E+06	2.911E+07	Yes
Summer	9/11/89	220	0.002387053	37.1	4.536E+08	2.067E+08	7.423E+08	Yes
Summer	8/11/80	180	0.000187220	77.1	2.911E+07	1.326E+07	5.822E+07	Yes
Summer	5/13/85	170	0.005616595	26.8	8.248E+08	3.758E+08	1.747E+09	Yes
Summer	6/10/86	170	0.121224843	2.3	1.780E+10	8.110E+09	3.770E+10	Yes
Summer	8/8/88	170	0.000093610	94.5	1.375E+07	6.263E+06	2.911E+07	Yes
Summer	7/10/78	130	0.000140415	82.1	1.577E+07	7.184E+06	4.366E+07	Yes
Summer	8/10/81	130	0.000046805	100.0	5.256E+06	2.395E+06	1.455E+07	Yes
Summer	5/14/84	130	0.009314187	20.4	1.046E+09	4.765E+08	2.896E+09	Yes
Summer	9/9/85	130	0.000093610	94.5	1.051E+07	4.789E+06	2.911E+07	Yes
Summer	8/14/89	130	0.005335765	27.5	5.992E+08	2.730E+08	1.659E+09	Yes
Summer	6/14/82	110	0.005757010	26.5	5.470E+08	2.492E+08	1.790E+09	Yes
Summer	6/11/84	110	0.001310539	45.7	1.245E+08	5.673E+07	4.075E+08	Yes
Summer	10/6/78	79	0.000093610	94.5	6.388E+06	2.910E+06	2.911E+07	Yes
Summer	5/12/80	79	0.020219742	13.1	1.380E+09	6.286E+08	6.288E+09	Yes
Summer	6/8/81	79	0.117480446	2.4	8.017E+09	3.652E+09	3.653E+10	Yes
Summer	7/8/85	79	0.001076514	49.0	7.346E+07	3.347E+07	3.348E+08	Yes
Summer	9/13/82	70	0.000187220	77.1	1.132E+07	5.158E+06	5.822E+07	Yes
Summer	6/13/83	70	0.003603982	32.1	2.179E+08	9.928E+07	1.121E+09	Yes
Summer	7/11/89	70	0.070675488	5.0	4.273E+09	1.947E+09	2.198E+10	Yes
Summer	10/10/83	49	0.000046805	100.0	1.981E+06	9.026E+05	1.455E+07	Yes
Summer	5/12/86	49	0.004774106	29.0	2.021E+08	9.206E+07	1.485E+09	Yes
Summer	7/14/86	49	0.005710205	26.7	2.417E+08	1.101E+08	1.776E+09	Yes
Summer	8/8/83	33	0.000140415	82.1	4.003E+06	1.824E+06	4.366E+07	Yes
Summer	5/14/79	23	0.050549355	6.9	1.004E+09	4.576E+08	1.572E+10	Yes
Summer	7/12/82	23	0.000421245	63.6	8.369E+06	3.813E+06	1.310E+08	Yes
Summer	7/9/84	23	0.004493276	29.8	8.927E+07	4.067E+07	1.397E+09	Yes
Summer	8/12/86	23	0.002153028	38.6	4.277E+07	1.949E+07	6.695E+08	Yes
Summer	7/11/83	14	0.000421245	63.6	5.094E+06	2.321E+06	1.310E+08	Yes
Summer	10/13/80	11	0.000046805	100.0	4.447E+05	2.026E+05	1.455E+07	Yes
Summer	9/14/81	8	0.000140415	82.1	9.703E+05	4.421E+05	4.366E+07	Yes

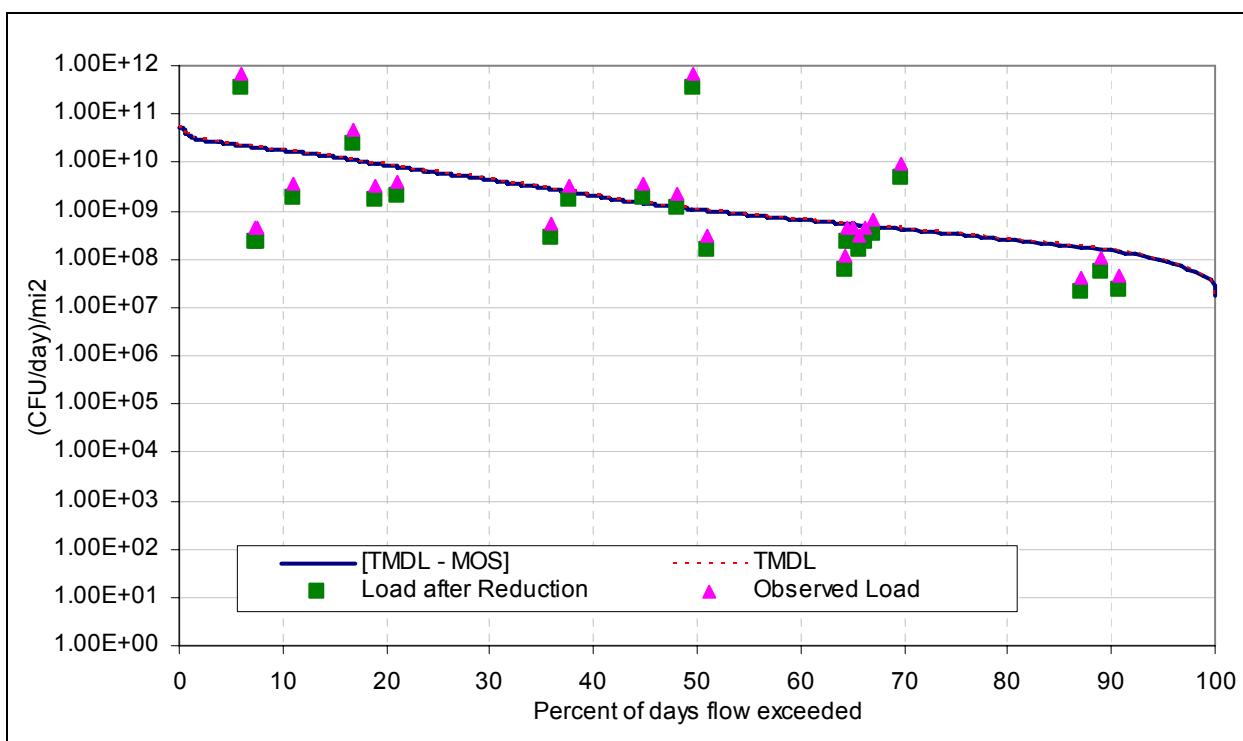


Figure M-3. Summer fecal coliform bacteria load duration curve for Flat River (subsegment 100406) east of Taylortown, Louisiana (station 272).

Table M-5. Summer allowable fecal coliform load for Flat River (subsegment 100406) east of Taylortown, Louisiana (station 272)

Season	Date	Observed flow (cfs)	Percent exceedance for observed flow	Adjusted flow for entire basin			Width for area under curves (%)	Allowable load to meet standard (CFU/day)/mi ²	Target load with MOS incorporated (CFU/day)/mi ²	Area under TMDL curve (CFU/day/mi ²)
				cfs	cfs/mi ²	cms/mi ²				5.71E+09
Summer	10/4/82	2	100.000	0.0223	0.002	0.000	0.00	19967456.96666	17970711.2700	0.00E+00
Summer	10/5/82	2	100.000	0.0223	0.002	0.000	0.00	19967456.96666	17970711.2700	0.00E+00
Summer	10/6/82	2	100.000	0.0223	0.002	0.000	0.00	19967456.96666	17970711.2700	0.00E+00
Summer	9/18/82	3	100.000	0.0334	0.003	0.000	0.00	29951185.45000	26956066.9050	0.00E+00
Summer	9/19/82	3	100.000	0.0334	0.003	0.000	0.00	29951185.45000	26956066.9050	0.00E+00
Summer	10/1/82	3	100.000	0.0334	0.003	0.000	0.00	29951185.45000	26956066.9050	0.00E+00
Summer	10/2/82	3	100.000	0.0334	0.003	0.000	0.00	29951185.45000	26956066.9050	0.00E+00
Summer	10/3/82	3	100.000	0.0334	0.003	0.000	0.00	29951185.45000	26956066.9050	0.00E+00
Summer	9/24/87	3	100.000	0.0334	0.003	0.000	0.00	29951185.45000	26956066.9050	0.00E+00
Summer	9/25/87	3	100.000	0.0334	0.003	0.000	0.00	29951185.45000	26956066.9050	0.00E+00
Summer	9/26/87	3	100.000	0.0334	0.003	0.000	0.00	29951185.45000	26956066.9050	0.00E+00
Summer	9/27/87	3	100.000	0.0334	0.003	0.000	0.30	29951185.45000	26956066.9050	8.99E+04

For brevity most of the cells in this spreadsheet have been hidden.

Summer	5/1/97	5510	0.300	61.3256	5.622	0.159	0.00	55010343943.1053	49509309548.7948	0.00E+00
Summer	5/7/97	5510	0.300	61.3256	5.622	0.159	0.00	55010343943.1053	49509309548.7948	0.00E+00
Summer	5/31/91	5550	0.300	61.7708	5.663	0.160	0.00	55409693082.4382	49868723774.1944	0.00E+00
Summer	5/2/97	5560	0.300	61.8821	5.673	0.161	0.10	55509530367.2715	49958577330.5443	5.55E+07
Summer	5/6/97	5670	0.200	63.1063	5.786	0.164	0.00	56607740500.4369	5094666450.3932	0.00E+00
Summer	5/7/91	5710	0.200	63.5515	5.827	0.165	0.00	57007089639.7698	51306380675.7928	0.00E+00
Summer	5/3/97	5820	0.200	64.7758	5.939	0.168	0.00	58105299772.9352	522946769795.6417	0.00E+00
Summer	5/5/97	5820	0.200	64.7758	5.939	0.168	0.10	58105299772.9352	522946769795.6417	5.81E+07
Summer	5/4/91	5870	0.100	65.3323	5.990	0.170	0.00	58604486197.1013	52744637577.3912	0.00E+00
Summer	5/6/91	5890	0.100	65.5549	6.010	0.170	0.00	58804460766.7678	5292344690.0910	0.00E+00
Summer	5/4/97	5910	0.100	65.7775	6.031	0.171	0.10	590003835336.4342	53103451802.7908	5.90E+07
Summer	5/5/91	5970	0.000	66.4453	6.092	0.173	0.00	59602859045.4336	53642573140.8902	0.00E+00

Table M-6. Summer existing fecal coliform load and percent reduction for Flat River (subsegment 100406) east of Taylortown, Louisiana (station 272)

Season	Date	Obs FC (CFU/100mL)	Flow/unit area on sampling day (cms/mi ²)	Percent exceedance for flow on sampling day	Current fecal coliform load (CFU/day)/mi ²	Reduced fecal coliform load (CFU/day)/mi ²	Allowable load with MOS incorporated (CFU/day)/mi ²	Reduced load less than or equal to allow load?
Summer	8/8/94	240000	0.003409598	49.7	7.068E+11	3.635E+11	1.060E+09	No
Summer	6/11/91	11000	0.072237245	5.9	6.864E+11	3.529E+11	2.246E+10	No
Summer	10/14/97	7900	0.001358060	69.6	9.267E+09	4.765E+09	4.223E+08	No
Summer	6/11/02	1600	0.035829673	16.8	4.952E+10	2.546E+10	1.114E+10	No
Summer	10/15/02	900	0.004680973	44.7	3.639E+09	1.871E+09	1.456E+09	No
Summer	10/11/94	700	0.003756337	48.0	2.271E+09	1.168E+09	1.168E+09	Yes
Summer	10/14/91	500	0.007946097	37.6	3.432E+09	1.765E+09	2.471E+09	Yes
Summer	10/11/93	490	0.001531430	66.9	6.482E+08	3.333E+08	4.762E+08	Yes
Summer	8/12/97	330	0.001589219	66.2	4.530E+08	2.329E+08	4.942E+08	Yes
Summer	8/14/90	300	0.001675904	65.0	4.343E+08	2.233E+08	5.212E+08	Yes
Summer	8/11/92	300	0.001704799	64.5	4.418E+08	2.272E+08	5.301E+08	Yes
Summer	8/5/02	240	0.000520108	89.0	1.078E+08	5.544E+07	1.617E+08	Yes
Summer	9/17/02	220	0.001647009	65.6	3.130E+08	1.609E+08	5.122E+08	Yes
Summer	6/15/92	170	0.026438832	21.0	3.882E+09	1.996E+09	8.222E+09	Yes
Summer	6/13/94	130	0.030050694	19.0	3.375E+09	1.735E+09	9.345E+09	Yes
Summer	10/16/90	110	0.000462318	90.7	4.393E+07	2.259E+07	1.438E+08	Yes
Summer	6/12/95	110	0.003236229	50.9	3.075E+08	1.581E+08	1.006E+09	Yes
Summer	5/14/02	80	0.054322408	11.0	3.754E+09	1.930E+09	1.689E+10	Yes
Summer	7/9/02	80	0.001733694	64.2	1.198E+08	6.160E+07	5.391E+08	Yes
Summer	8/15/95	79	0.000577898	87.0	3.944E+07	2.028E+07	1.797E+08	Yes
Summer	10/15/96	70	0.008957418	36.0	5.416E+08	2.785E+08	2.785E+09	Yes
Summer	6/11/90	8	0.066458265	7.3	4.593E+08	2.361E+08	2.067E+10	Yes
Summer	6/9/97	8	0.065591418	7.5	4.533E+08	2.331E+08	2.040E+10	Yes

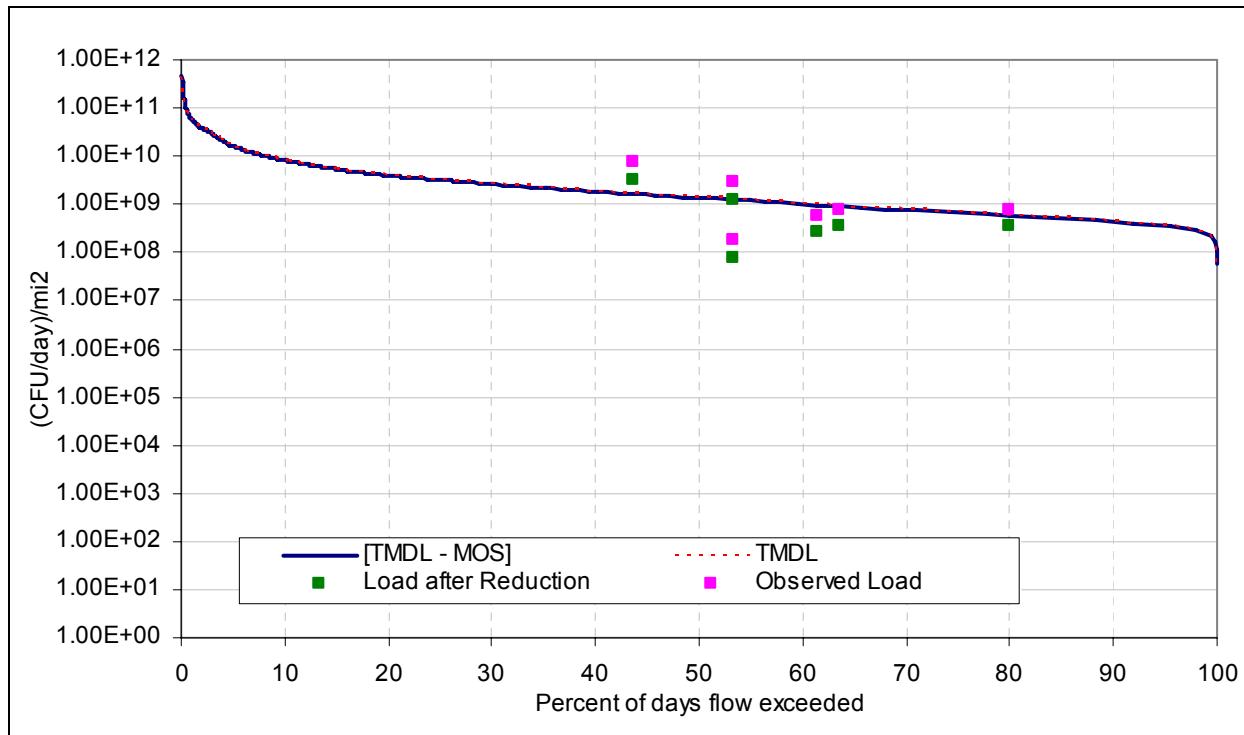
**Figure M-4. Summer fecal coliform bacteria load duration curve for Castor Creek (subsegment 100707) at Highway 507, southwest of Castor, Louisiana (station 1189).**

Table M-7. Summer allowable fecal coliform load for Castor Creek (subsegment 100707) at Highway 507, southwest of Castor, Louisiana (station 1189)

Season	Date	Observed flow (cfs)	Percent exceedance for observed flow	Adjusted flow for entire basin			Width for area under curves (%)	Allowable load to meet standard (CFU/day)/mi ²	Target load with MOS incorporated (CFU/day)/mi ²	Area under TMDL curve (CFU/day/mi ²)
				cfs	cfs/mi ²	cms/mi ²				
Summer	8/31/00	1	100.000	0.0221	0.006	0.000	0.00	63532817.6211	57179535.8590	5.16E+09
Summer	9/1/00	1	100.000	0.0221	0.006	0.000	0.00	63532817.6211	57179535.8590	0.00E+00
Summer	9/6/00	1	100.000	0.0221	0.006	0.000	0.00	63532817.6211	57179535.8590	0.00E+00
Summer	8/14/00	2	100.000	0.0441	0.013	0.000	0.00	127065635.2423	114359071.7181	0.00E+00
Summer	8/15/00	2	100.000	0.0441	0.013	0.000	0.00	127065635.2423	114359071.7181	0.00E+00
Summer	8/16/00	2	100.000	0.0441	0.013	0.000	0.00	127065635.2423	114359071.7181	0.00E+00
Summer	8/17/00	2	100.000	0.0441	0.013	0.000	0.00	127065635.2423	114359071.7181	0.00E+00
Summer	8/21/00	2	100.000	0.0441	0.013	0.000	0.00	127065635.2423	114359071.7181	0.00E+00
Summer	8/22/00	2	100.000	0.0441	0.013	0.000	0.00	127065635.2423	114359071.7181	0.00E+00
Summer	8/28/00	2	100.000	0.0441	0.013	0.000	0.00	127065635.2423	114359071.7181	0.00E+00
Summer	8/29/00	2	100.000	0.0441	0.013	0.000	0.00	127065635.2423	114359071.7181	0.00E+00
Summer	8/30/00	2	100.000	0.0441	0.013	0.000	0.00	127065635.2423	114359071.7181	0.00E+00
Summer	5/7/89	3050	0.200	67.3251	19.805	0.561	0.00	193775093744.4810	174397584370.0330	0.00E+00
Summer	5/15/75	3080	0.200	67.9873	20.000	0.566	0.00	195681079273.1150	176112970445.8040	0.00E+00
Summer	5/8/78	3410	0.200	75.2717	22.143	0.6277	0.00	216646908088.0920	194982217279.2830	0.00E+00
Summer	5/5/91	3460	0.200	76.3753	22.468	0.636	0.00	219823548969.1490	197841194072.2340	0.00E+00
Summer	6/29/89	3550	0.200	78.3620	23.052	0.653	0.10	225541502555.0520	202987352299.5460	2.26E+08
Summer	5/9/78	4370	0.100	96.4625	28.377	0.804	0.00	277638413004.3870	249874571703.9490	0.00E+00
Summer	5/4/75	5240	0.100	115.6667	34.026	0.964	0.00	332911964334.7800	299620767901.3020	0.00E+00
Summer	5/18/89	5810	0.100	128.2488	37.727	1.068	0.00	369125670378.8310	332213103340.9480	0.00E+00
Summer	6/30/89	5930	0.100	130.8976	38.506	1.090	0.00	376749608493.3680	339074647644.0310	0.00E+00
Summer	7/2/89	6040	0.100	133.3257	39.221	1.111	0.00	383738218431.6930	345364396588.5240	0.00E+00
Summer	5/6/89	6060	0.100	133.7672	39.351	1.114	0.00	385508874784.1160	346507987305.7050	0.00E+00
Summer	7/1/89	6200	0.100	136.8576	40.260	1.140	0.10	393903469251.0760	354513122325.9690	3.94E+08
Summer	5/19/89	8050	0.000	177.6941	52.273	1.480	0.00	511439181850.1880	460295263665.1690	0.00E+00

For brevity most of the cells in this spreadsheet have been hidden.

Table M-8. Summer existing fecal coliform load and percent reduction for Castor Creek (subsegment 100707) at Highway 507, southwest of Castor, Louisiana (station 1189)

Season	Date	Obs FC (CFU/100mL)	Flow/unit area on sampling day (cms/mi ²)	Percent exceedance for flow on sampling day	Current fecal coliform load (CFU/day)/mi ²	Reduced fecal coliform load (CFU/day)/mi ²	Allowable load with MOS incorporated (CFU/day)/mi ²	Reduced load less than or equal to allow load?
Summer	05/13/02	1600	0.005332422	43.6	7.370E+09	3.316E+09	1.658E+09	No
Summer	10/14/02	800	0.004045286	53.2	2.795E+09	1.258E+09	1.258E+09	Yes
Summer	08/12/02	500	0.001838766	80.0	7.942E+08	3.574E+08	5.718E+08	Yes
Summer	09/16/02	300	0.002942026	63.5	7.624E+08	3.431E+08	9.149E+08	Yes
Summer	07/15/02	220	0.003125903	61.3	5.940E+08	2.673E+08	9.721E+08	Yes
Summer	06/10/02	50	0.004045286	53.2	1.747E+08	7.862E+07	1.258E+09	Yes

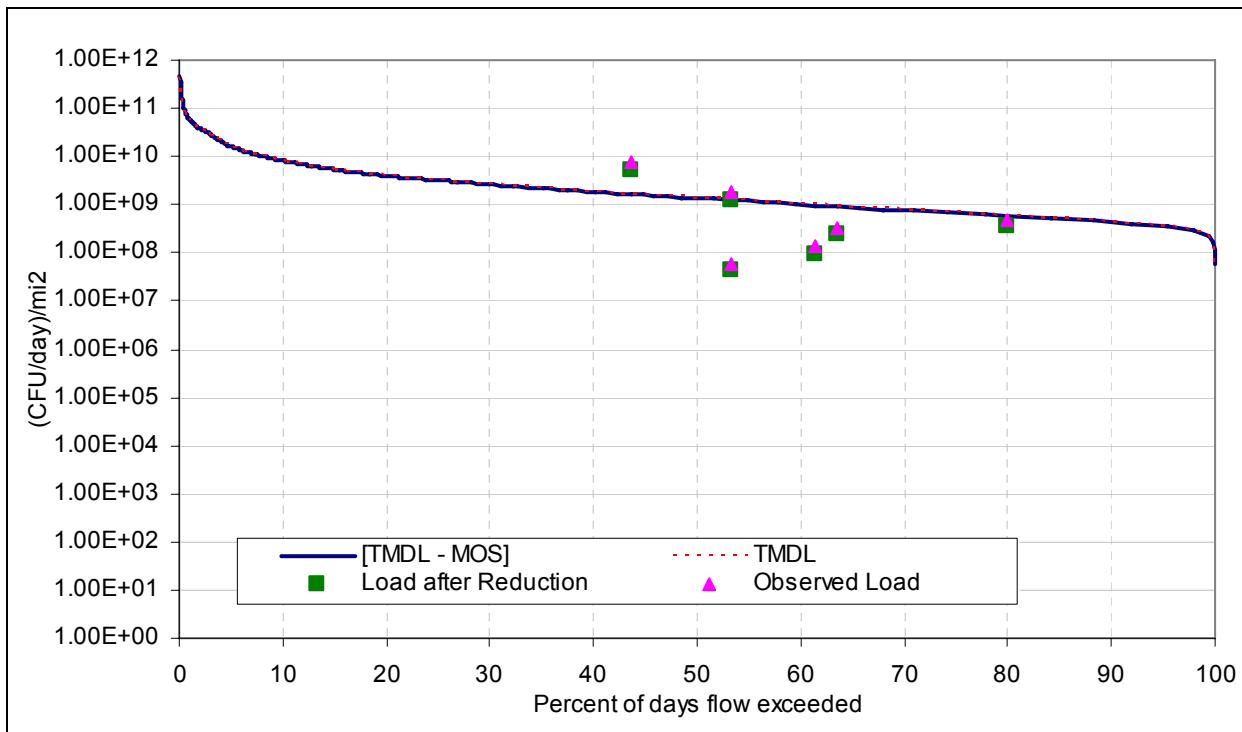
**Figure M-5. Summer fecal coliform bacteria load duration curve for Grand Bayou (subsegment 100709) at Highway 507, north of Fairview Alpha, Louisiana (station 1190).**

Table M-9. Summer allowable fecal coliform load for Grand Bayou (subsegment 100709) at Highway 507, north of Fairview Alpha, Louisiana (station 1190)

Season	Date	Observed flow (cfs)	Percent exceedance for observed flow	Adjusted flow for entire basin			Width for area under curves (%)	Allowable load to meet standard (CFU/day)/mi ²	Target load with MOS incorporated (CFU/day)/mi ²	Area under TMDL curve (CFU/day/mi ²)
				cfs	cfs/mi ²	cms/mi ²				5.16E+09
Summer	8/31/00	1	100.000	0.0817	0.006	0.000	0.00	63532817.6211	57179535.8590	0.00E+00
Summer	9/1/00	1	100.000	0.0817	0.006	0.000	0.00	63532817.6211	57179535.8590	0.00E+00
Summer	9/6/00	1	100.000	0.0817	0.006	0.000	0.00	63532817.6211	57179535.8590	0.00E+00
Summer	8/14/00	2	100.000	0.1634	0.013	0.000	0.00	127065635.2423	114359071.7181	0.00E+00
Summer	8/15/00	2	100.000	0.1634	0.013	0.000	0.00	127065635.2423	114359071.7181	0.00E+00
Summer	8/16/00	2	100.000	0.1634	0.013	0.000	0.00	127065635.2423	114359071.7181	0.00E+00
Summer	8/17/00	2	100.000	0.1634	0.013	0.000	0.00	127065635.2423	114359071.7181	0.00E+00
Summer	8/21/00	2	100.000	0.1634	0.013	0.000	0.00	127065635.2423	114359071.7181	0.00E+00
Summer	8/22/00	2	100.000	0.1634	0.013	0.000	0.00	127065635.2423	114359071.7181	0.00E+00
Summer	8/28/00	2	100.000	0.1634	0.013	0.000	0.00	127065635.2423	114359071.7181	0.00E+00
Summer	8/29/00	2	100.000	0.1634	0.013	0.000	0.00	127065635.2423	114359071.7181	0.00E+00
Summer	8/30/00	2	100.000	0.1634	0.013	0.000	0.00	127065635.2423	114359071.7181	0.00E+00
Summer	5/7/89	3050	0.200	249.2389	19.805	0.561	0.00	193775093744.4810	174397584370.0330	0.00E+00
Summer	5/5/75	3080	0.200	251.6904	20.000	0.566	0.00	195681078273.1150	176112970445.8040	0.00E+00
Summer	5/8/78	3410	0.200	278.6572	22.143	0.627	0.00	216646908088.0920	194982217279.2830	0.00E+00
Summer	5/5/91	3460	0.200	282.7431	22.468	0.636	0.00	219823548969.1490	197841194072.2340	0.00E+00
Summer	6/29/89	3550	0.200	290.0977	23.052	0.653	0.10	225541502555.0520	202987352299.5460	2.26E+08
Summer	5/9/78	4370	0.100	357.1062	28.377	0.804	0.00	277638413004.3870	249874571703.9490	0.00E+00
Summer	5/4/75	5240	0.100	428.2006	34.026	0.964	0.00	332911964334.7800	299620767901.3020	0.00E+00
Summer	5/18/89	5810	0.100	474.7796	37.727	1.068	0.00	369125670378.8310	332213103340.9480	0.00E+00
Summer	6/30/89	5930	0.100	484.5857	38.506	1.090	0.00	376749608493.3680	339074647644.0310	0.00E+00
Summer	7/2/89	6040	0.100	493.5747	39.221	1.111	0.00	383738218431.6930	345364396588.5240	0.00E+00
Summer	5/6/89	6060	0.100	495.2090	39.351	1.114	0.00	385008874784.1160	34650987305.7050	0.00E+00
Summer	7/1/89	6200	0.100	506.6495	40.260	1.140	0.10	393903469251.0760	354513122325.9690	3.94E+08
Summer	5/19/89	8050	0.000	657.8272	52.273	1.480	0.00	511439181850.1880	460295263665.1690	0.00E+00

For brevity most of the cells in this spreadsheet have been hidden.

Table M-10. Summer existing fecal coliform load and percent reduction for Grand Bayou (subsegment 100709) at Highway 507, north of Fairview Alpha, Louisiana (station 1190)

Season	Date	Obs FC (CFU/100mL)	Flow/unit area on sampling day (cms/mi ²)	Percent exceedance for flow on sampling day	Current fecal coliform load (CFU/day)/mi ²	Reduced fecal coliform load (CFU/day)/mi ²	Allowable load with MOS incorporated (CFU/day)/mi ²	Reduced load less than or equal to allow load?
Summer	05/13/02	1600	0.005332422	43.6	7.370E+09	5.306E+09	1.658E+09	No
Summer	10/14/02	500	0.004045286	53.2	1.747E+09	1.258E+09	1.258E+09	Yes
Summer	08/12/02	300	0.001838766	80.0	4.765E+08	3.431E+08	5.718E+08	Yes
Summer	09/16/02	130	0.002942026	63.5	3.304E+08	2.379E+08	9.149E+08	Yes
Summer	07/15/02	50	0.003125903	61.3	1.350E+08	9.721E+07	9.721E+08	Yes
Summer	06/10/02	17	0.004045286	53.2	5.940E+07	4.277E+07	1.258E+09	Yes

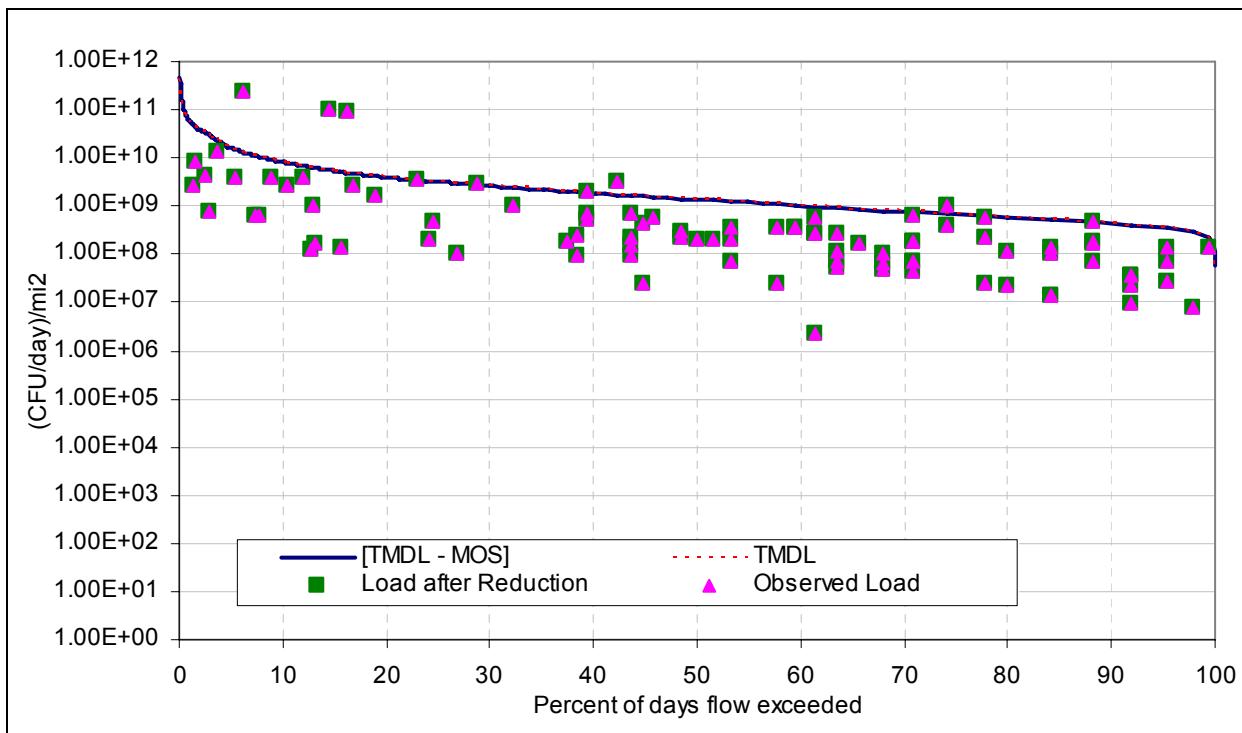
**Figure M-6. Summer fecal coliform bacteria load duration curve for Saline Bayou (subsegment 100801) near Goldonna, Louisiana (station 75).**

Table M-11. Summer allowable fecal coliform load for Saline Bayou (subsegment 100801) near Goldonna, Louisiana (station 75)

Season	Date	Observed flow (cfs)	Percent exceedance for observed flow	Adjusted flow for entire basin			Width for area under curves (%)	Allowable load to meet standard (CFU/day)/mi ²	Target load with MOS incorporated (CFU/day)/mi ²	Area under TMDL curve (CFU/day/mi ²)
				cfs	cfs/mi ²	cms/mi ²				5.16E+09
Summer	8/31/00	1	100.000	0.1822	0.006	0.000	0.00	63532817.62/1	57179535.85/90	0.00E+00
Summer	9/1/00	1	100.000	0.1822	0.006	0.000	0.00	63532817.62/1	57179535.85/90	0.00E+00
Summer	9/6/00	1	100.000	0.1822	0.006	0.000	0.00	63532817.62/1	57179535.85/90	0.00E+00
Summer	8/14/00	2	100.000	0.3644	0.013	0.000	0.00	127065635.24/23	114359071.71/81	0.00E+00
Summer	8/15/00	2	100.000	0.3644	0.013	0.000	0.00	127065635.24/23	114359071.71/81	0.00E+00
Summer	8/16/00	2	100.000	0.3644	0.013	0.000	0.00	127065635.24/23	114359071.71/81	0.00E+00
Summer	8/17/00	2	100.000	0.3644	0.013	0.000	0.00	127065635.24/23	114359071.71/81	0.00E+00
Summer	8/21/00	2	100.000	0.3644	0.013	0.000	0.00	127065635.24/23	114359071.71/81	0.00E+00
Summer	8/22/00	2	100.000	0.3644	0.013	0.000	0.00	127065635.24/23	114359071.71/81	0.00E+00
Summer	8/28/00	2	100.000	0.3644	0.013	0.000	0.00	127065635.24/23	114359071.71/81	0.00E+00
Summer	8/29/00	2	100.000	0.3644	0.013	0.000	0.00	127065635.24/23	114359071.71/81	0.00E+00
Summer	8/30/00	2	100.000	0.3644	0.013	0.000	0.00	127065635.24/23	114359071.71/81	0.00E+00
Summer	5/7/89	3050	0.200	555.7256	19.805	0.561	0.00	193775093744.48/10	174397584370.03/30	0.00E+00
Summer	5/5/75	3080	0.200	561.1918	20.000	0.566	0.00	195681078273.11/50	176112970445.80/40	0.00E+00
Summer	5/8/78	3410	0.200	621.3195	22.143	0.627	0.00	216646908088.09/20	194982217279.28/30	0.00E+00
Summer	5/5/91	3460	0.200	630.4297	22.468	0.636	0.00	219823548969.14/90	197841194072.23/40	0.00E+00
Summer	6/29/89	3550	0.200	646.8282	23.052	0.653	0.10	225541502555.05/20	20298752299.54/60	2.26E+08
Summer	5/9/78	4370	0.100	796.2364	28.377	0.804	0.00	2776384130004.38/10	249874571703.94/90	0.00E+00
Summer	5/4/75	5240	0.100	954.7549	34.026	0.964	0.00	332911964334.78/00	2996207677901.30/20	0.00E+00
Summer	5/18/89	5610	0.100	1058.6118	37.727	1.068	0.00	369125670378.83/10	332213103340.94/80	0.00E+00
Summer	6/30/89	5930	0.100	1080.4764	38.506	1.090	0.00	376749608493.36/80	339074647644.03/10	0.00E+00
Summer	7/2/89	6040	0.100	1100.5190	39.221	1.111	0.00	383738218431.69/30	345364396588.52/40	0.00E+00
Summer	5/6/89	6060	0.100	1104.1631	39.351	1.114	0.00	38508874784.16/0	346507987305.70/50	0.00E+00
Summer	7/1/89	6200	0.100	1129.6718	40.260	1.140	0.10	393903469251.07/60	354513122325.96/90	3.94E+08
Summer	5/19/89	8050	0.000	1466.7513	52.273	1.480	0.00	511439181850.18/80	460295263665.16/90	0.00E+00

For brevity most of the cells in this spreadsheet have been hidden.

Table M-12. Summer existing fecal coliform load and percent reduction for Saline Bayou (subsegment 100801) near Goldonna, Louisiana (station 75)

Season	Date	Obs FC (CFU/100mL)	Flow/unit area on sampling day (cms/mi ²)	Percent exceedance for flow on sampling day	Current fecal coliform load (CFU/day)/mi ²	Reduced fecal coliform load (CFU/day)/mi ²	Allowable load with MOS incorporated (CFU/day)/mi ²	Reduced load less than or equal to allow load?
Summer	10/15/85	16000	0.006594370	16.3	9.114E+10	9.114E+10	2.051E+09	No
Summer	10/13/86	16000	0.017533266	6.2	2.423E+11	2.423E+11	5.452E+09	No
Summer	06/11/91	16000	0.007602921	14.5	1.051E+11	1.051E+11	2.364E+09	No
Summer	06/03/02	1600	0.002327425	42.2	3.217E+09	3.217E+09	7.238E+08	No
Summer	10/12/87	1300	0.000930970	74.2	1.045E+09	1.045E+09	2.895E+08	No
Summer	05/12/92	900	0.003723879	28.7	2.895E+09	2.895E+09	1.158E+09	No
Summer	06/12/95	900	0.002560167	39.4	1.990E+09	1.990E+09	7.961E+08	No
Summer	06/10/97	900	0.004732430	22.9	3.679E+09	3.679E+09	1.472E+09	No
Summer	09/09/97	900	0.000620647	88.3	4.825E+08	4.825E+08	1.930E+08	No
Summer	09/14/81	790	0.000853389	77.8	5.824E+08	5.824E+08	2.654E+08	No
Summer	06/10/85	700	0.001008551	70.9	6.098E+08	6.098E+08	3.136E+08	No
Summer	06/16/92	500	0.009309699	11.9	4.021E+09	4.021E+09	2.895E+09	No
Summer	08/11/92	500	0.001318874	61.3	5.696E+08	5.696E+08	4.101E+08	No
Summer	05/09/95	500	0.031032329	3.7	1.340E+10	1.340E+10	9.650E+09	No
For brevity most of the cells in this spreadsheet have been hidden.								
Summer	10/08/79	33	0.000853389	77.8	2.433E+07	2.433E+07	2.654E+08	Yes
Summer	09/10/91	30	0.004034203	26.8	1.045E+08	1.045E+08	1.255E+09	Yes
Summer	08/14/78	23	0.000387904	97.9	7.707E+06	7.707E+06	1.206E+08	Yes
Summer	10/11/83	23	0.000698227	84.1	1.387E+07	1.387E+07	2.171E+08	Yes
Summer	06/12/90	23	0.006904693	15.6	1.372E+08	1.372E+08	2.147E+09	Yes
Summer	05/13/97	23	0.008456310	13.1	1.680E+08	1.680E+08	2.630E+09	Yes
Summer	07/11/89	22	0.041428159	2.8	7.873E+08	7.873E+08	1.288E+10	Yes
Summer	08/05/02	22	0.000698227	84.1	1.327E+07	1.327E+07	2.171E+08	Yes
Summer	07/10/78	20	0.000543066	91.9	9.382E+06	9.382E+06	1.689E+08	Yes
Summer	07/13/82	20	0.001474036	57.7	2.547E+07	2.547E+07	4.584E+08	Yes
Summer	06/13/89	17	0.008689052	12.8	1.276E+08	1.276E+08	2.702E+09	Yes
Summer	07/16/91	13	0.002172263	44.8	2.439E+07	2.439E+07	6.755E+08	Yes
Summer	06/12/78	2	0.001318874	61.3	2.278E+06	2.278E+06	4.101E+08	Yes

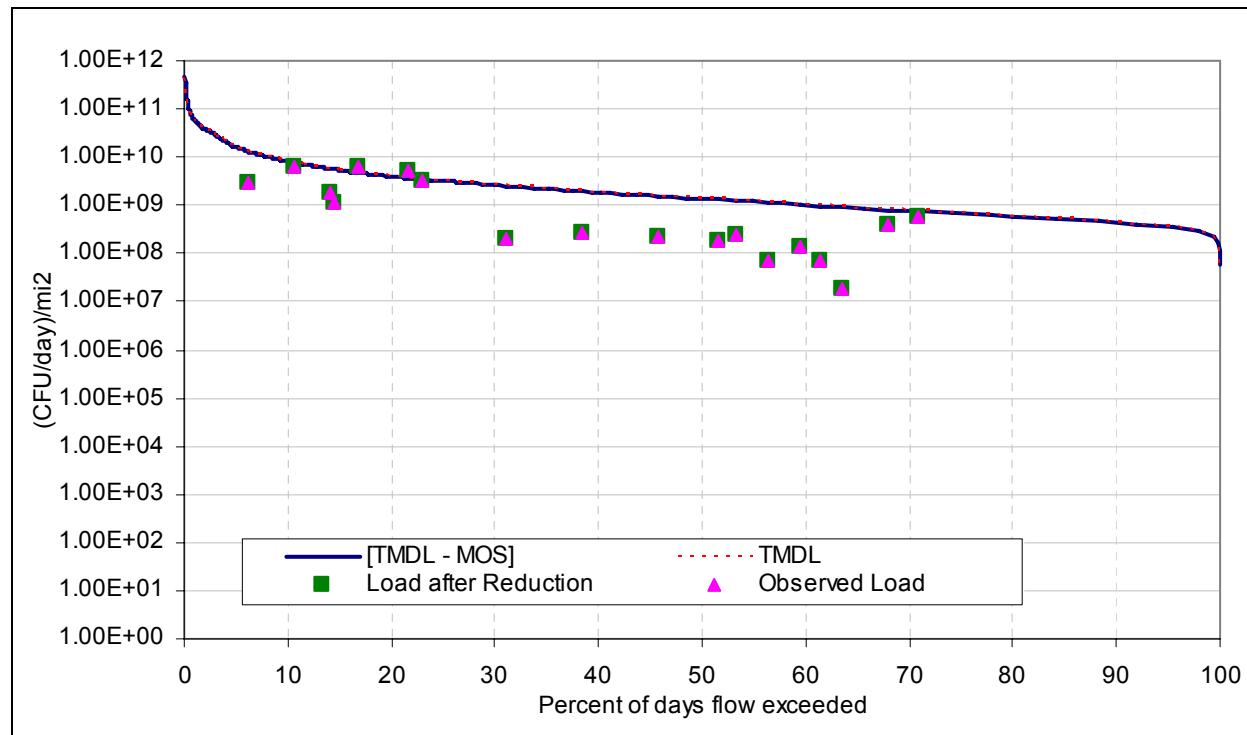
**Figure M-7. Summer fecal coliform bacteria load duration curve for Saline Bayou (subsegment 100801) east of Bienville, Louisiana (station 284).**

Table M-13. Summer allowable fecal coliform load for Saline Bayou (subsegment 100801) east of Bienville, Louisiana (station 284)

Season	Date	Observed flow (cfs)	Percent exceedance for observed flow	Adjusted flow for entire basin			Width for area under curves (%)	Allowable load to meet standard (CFU/day)/mi ²	Target load with MOS incorporated (CFU/day)/mi ²	Area under TMDL curve (CFU/day/mi ²)
				cfs	cfs/mi ²	cms/mi ²				5.16E+09
Summer	8/31/00	1	100.000	0.1822	0.006	0.000	0.0	63532817.6211	57179535.8590	0.00E+00
Summer	9/1/00	1	100.000	0.1822	0.006	0.000	0.0	63532817.6211	57179535.8590	0.00E+00
Summer	9/6/00	1	100.000	0.1822	0.006	0.000	0.0	63532817.6211	57179535.8590	0.00E+00
Summer	8/14/00	2	100.000	0.3644	0.013	0.000	0.0	127065635.2423	114359071.7181	0.00E+00
Summer	8/15/00	2	100.000	0.3644	0.013	0.000	0.0	127065635.2423	114359071.7181	0.00E+00
Summer	8/16/00	2	100.000	0.3644	0.013	0.000	0.0	127065635.2423	114359071.7181	0.00E+00
Summer	8/17/00	2	100.000	0.3644	0.013	0.000	0.0	127065635.2423	114359071.7181	0.00E+00
Summer	8/21/00	2	100.000	0.3644	0.013	0.000	0.0	127065635.2423	114359071.7181	0.00E+00
Summer	8/22/00	2	100.000	0.3644	0.013	0.000	0.0	127065635.2423	114359071.7181	0.00E+00
Summer	8/28/00	2	100.000	0.3644	0.013	0.000	0.0	127065635.2423	114359071.7181	0.00E+00
Summer	8/29/00	2	100.000	0.3644	0.013	0.000	0.0	127065635.2423	114359071.7181	0.00E+00
Summer	8/30/00	2	100.000	0.3644	0.013	0.000	0.0	127065635.2423	114359071.7181	0.00E+00
Summer	5/7/89	3050	0.200	555.7256	19.805	0.561	0.0	193775093744.4810	174397584370.0330	0.00E+00
Summer	5/5/75	3080	0.200	561.1918	20.000	0.566	0.0	195681078273.1150	176112970445.8040	0.00E+00
Summer	5/8/78	3410	0.200	621.3195	22.143	0.627	0.0	216646908088.0920	194982217279.2830	0.00E+00
Summer	5/5/91	3460	0.200	630.4297	22.468	0.636	0.0	219823548969.1490	197841194072.2340	0.00E+00
Summer	6/29/89	3550	0.200	646.8282	23.052	0.653	0.1	225541502555.0520	202987352299.5460	2.26E+08
Summer	5/9/78	4370	0.100	796.2364	28.377	0.804	0.0	277638413004.3870	249874571703.9490	0.00E+00
Summer	5/4/75	5240	0.100	954.7549	34.026	0.964	0.0	332911964334.7800	299620767901.3020	0.00E+00
Summer	5/18/89	5810	0.100	1058.6118	37.727	1.068	0.0	369125670378.8310	332213103340.9480	0.00E+00
Summer	6/30/89	5930	0.100	1080.4764	38.506	1.090	0.0	376749608493.3680	339074647644.0310	0.00E+00
Summer	7/2/89	6040	0.100	1100.5190	39.221	1.111	0.0	383738218431.6930	345364396588.5240	0.00E+00
Summer	5/6/89	6060	0.100	1104.1631	39.351	1.114	0.0	38508874784.1160	346507987305.7050	0.00E+00
Summer	7/1/89	6200	0.100	1129.6718	40.260	1.140	0.1	393903469251.0760	354513122325.9690	3.94E+08
Summer	5/19/89	8050	0.000	1466.7513	52.273	1.480	0.0	511439181850.1880	460295263665.1690	0.00E+00

For brevity most of the cells in this spreadsheet have been hidden.

Table M-14. Summer existing fecal coliform load and percent reduction for Saline Bayou (subsegment 100801) east of Bienville, Louisiana (station 284)

Season	Date	Obs FC (CFU/100mL)	Flow/unit area on sampling day (cms/mi ²)	Percent exceedance for flow on sampling day	Current fecal coliform load (CFU/day)/mi ²	Reduced fecal coliform load (CFU/day)/mi ²	Allowable load with MOS incorporated (CFU/day)/mi ²	Reduced load less than or equal to allow load?
Summer	06/10/91	500	0.011768104	21.7	5.083E+09	5.083E+09	3.659E+09	No
Summer	10/14/97	490	0.015261760	16.7	6.460E+09	6.460E+09	4.746E+09	No
Summer	06/10/97	330	0.011216474	22.9	3.197E+09	3.197E+09	3.488E+09	Yes
Summer	06/15/92	300	0.024823344	10.6	6.433E+09	6.433E+09	7.719E+09	Yes
Summer	10/15/96	280	0.002390396	70.9	5.781E+08	5.781E+08	7.433E+08	Yes
Summer	08/10/92	170	0.002574273	68.0	3.780E+08	3.780E+08	8.005E+08	Yes
Summer	06/11/90	110	0.018755416	14.0	1.782E+09	1.782E+09	5.832E+09	Yes
Summer	06/13/94	79	0.041372240	6.2	2.823E+09	2.823E+09	1.287E+10	Yes
Summer	08/08/94	70	0.004045286	53.2	2.446E+08	2.446E+08	1.258E+09	Yes
Summer	08/12/97	70	0.018203786	14.4	1.101E+09	1.101E+09	5.661E+09	Yes
Summer	08/13/90	50	0.004229162	51.6	1.827E+08	1.827E+08	1.315E+09	Yes
Summer	10/15/90	50	0.003309779	59.4	1.429E+08	1.429E+08	1.029E+09	Yes
Summer	10/14/91	50	0.004964669	45.8	2.144E+08	2.144E+08	1.544E+09	Yes
Summer	06/13/95	49	0.006251805	38.5	2.646E+08	2.646E+08	1.944E+09	Yes
Summer	08/12/91	30	0.008090571	31.1	2.097E+08	2.097E+08	2.516E+09	Yes
Summer	10/12/93	26	0.003125903	61.3	7.020E+07	7.020E+07	9.721E+08	Yes
Summer	10/10/94	22	0.003677532	56.3	6.989E+07	6.989E+07	1.144E+09	Yes
Summer	08/15/95	7	0.002942026	63.5	1.779E+07	1.779E+07	9.149E+08	Yes

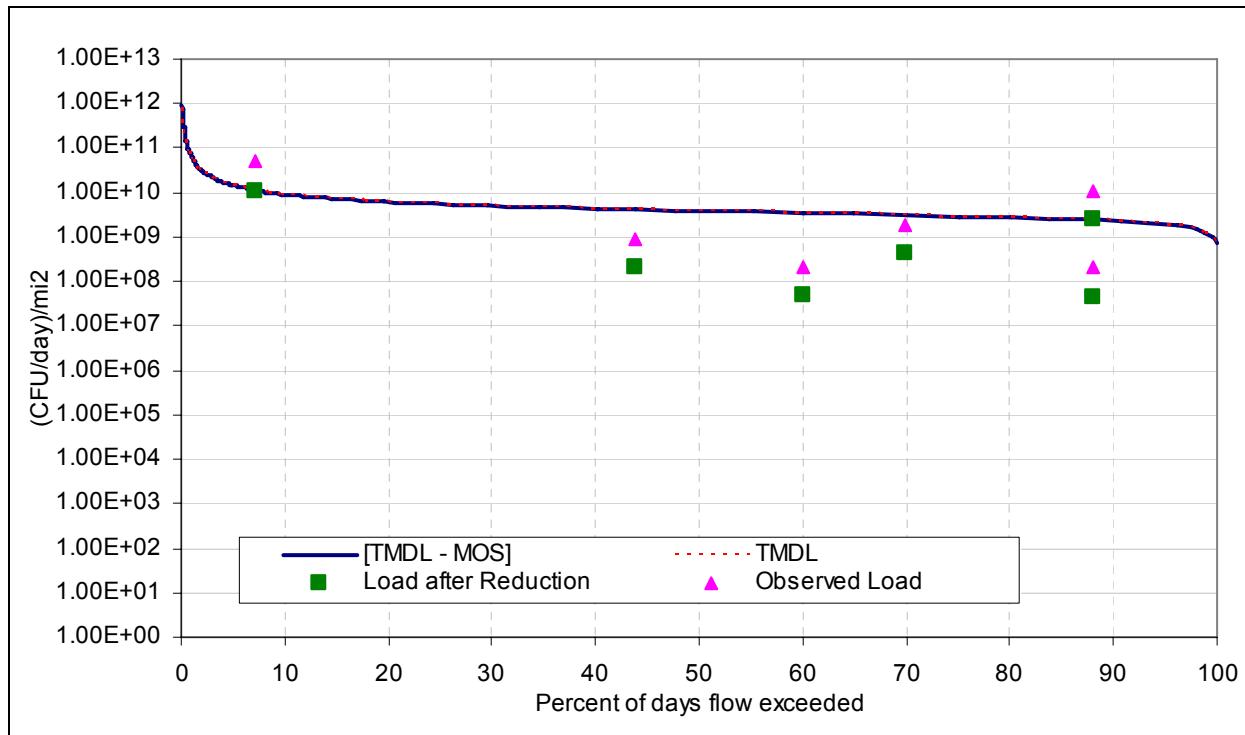


Figure M-8. Summer fecal coliform bacteria load duration curve for Rigolette Bayou (subsegment 100901) northwest of Pineville, Louisiana (station 1220).

Table M-15. Summer allowable fecal coliform load for Rigolette Bayou (subsegment 100901) northwest of Pineville, Louisiana (station 1220)

Season	Date	Observed flow (cfs)	Percent exceedance for observed flow	Adjusted flow for entire basin			Width for area under curves (%)	Allowable load to meet standard (CFU/day)/mi ²	Target load with MOS incorporated (CFU/day)/mi ²	Area under TMDL curve (CFU/day/mi ²)
				cfs	cfs/mi ²	cms/mi ²				
Summer	8/30/00	4	100.000	0.54440	0.078	0.002	0.00	767376777.5416	690639099.7875	8.12E+09
Summer	8/31/00	4	100.000	0.54440	0.078	0.002	0.00	767376777.5416	690639099.7875	0.00E+00
Summer	9/1/00	4	100.000	0.54440	0.078	0.002	0.00	767376777.5416	690639099.7875	0.00E+00
Summer	9/2/00	4	100.000	0.54440	0.078	0.002	0.00	767376777.5416	690639099.7875	0.00E+00
Summer	9/3/00	4	100.000	0.54440	0.078	0.002	0.00	767376777.5416	690639099.7875	0.00E+00
Summer	9/4/00	4	100.000	0.54440	0.078	0.002	0.00	767376777.5416	690639099.7875	0.00E+00
Summer	9/5/00	4	100.000	0.54440	0.078	0.002	0.00	767376777.5416	690639099.7875	0.00E+00
Summer	9/6/00	4	100.000	0.54440	0.078	0.002	0.00	767376777.5416	690639099.7875	0.00E+00
Summer	9/7/00	4	100.000	0.54440	0.078	0.002	0.20	767376777.5416	690639099.7875	1.53E+06
Summer	8/14/00	5	99.800	0.68000	0.098	0.003	0.00	959220971.9270	863298874.7343	0.00E+00
Summer	8/15/00	5	99.800	0.68000	0.098	0.003	0.00	959220971.9270	863298874.7343	0.00E+00
Summer	8/19/00	5	99.800	0.68000	0.098	0.003	0.00	959220971.9270	863298874.7343	0.00E+00
Summer	10/29/85	1290	0.300	175.4485	25.294	0.716	0.00	247479010757.1750	222731109681.4580	0.00E+00
Summer	5/21/83	1310	0.300	178.1686	25.686	0.727	0.00	251315894644.8830	226184305180.3950	0.00E+00
Summer	6/30/89	1420	0.300	193.1294	27.843	0.788	0.00	272418756027.2780	245176880424.5500	0.00E+00
Summer	5/20/83	1630	0.300	221.6907	31.961	0.905	0.10	31270636848.2140	281435433163.3920	3.13E+08
Summer	5/19/89	1730	0.200	235.2914	33.922	0.961	0.00	331890456286.7540	2987014.10658.0790	0.00E+00
Summer	10/22/84	1820	0.200	247.5320	35.686	1.011	0.00	349156433781.4410	314240790403.2970	0.00E+00
Summer	6/28/89	1840	0.200	250.2521	36.078	1.022	0.00	352993317669.1490	317693985902.2340	0.00E+00
Summer	10/30/85	2360	0.200	320.9756	46.275	1.310	0.10	452752298749.5610	407477068874.6050	4.53E+08
Summer	9/3/85	2520	0.100	342.7366	49.412	1.399	0.00	483447369851.2260	4351026323866.1030	0.00E+00
Summer	6/29/89	3040	0.100	413.4600	59.608	1.688	0.00	583206350931.6370	524885715638.4740	0.00E+00
Summer	5/18/89	3330	0.100	452.9019	65.294	1.849	0.00	639841167303.4050	574957050573.0650	0.00E+00
Summer	5/19/83	4410	0.100	599.7891	86.471	2.449	0.10	846032897239.6450	761429607515.6810	8.46E+08
Summer	10/21/84	5390	0.000	733.0755	105.686	2.993	0.00	1034040207737.3400	930636186963.6100	0.00E+00

For brevity most of the cells in this spreadsheet have been hidden.

Table M-16. Summer existing fecal coliform load and percent reduction for Rigolette Bayou (subsegment 100901) northwest of Pineville, Louisiana (station 1220)

Season	Date	Obs FC (CFU/100mL)	Flow/unit area on sampling day (cms/mi ²)	Percent exceedance for flow on sampling day	Current fecal coliform load (CFU/day)/mi ²	Reduced fecal coliform load (CFU/day)/mi ²	Allowable load with MOS incorporated (CFU/day)/mi ²	Reduced load less than or equal to allow load?
Summer	07/22/02	1600	0.007773294	88.1	1.074E+10	2.417E+09	2.417E+09	Yes
Summer	10/21/02	1600	0.036090294	7.1	4.988E+10	1.122E+10	1.122E+10	Yes
Summer	09/23/02	220	0.009994235	69.9	1.899E+09	4.273E+08	3.108E+09	Yes
Summer	05/20/02	80	0.013325647	43.9	9.209E+08	2.072E+08	4.144E+09	Yes
Summer	08/19/02	30	0.007773294	88.1	2.014E+08	4.532E+07	2.417E+09	Yes
Summer	06/17/02	23	0.011104706	60.1	2.206E+08	4.964E+07	3.453E+09	Yes

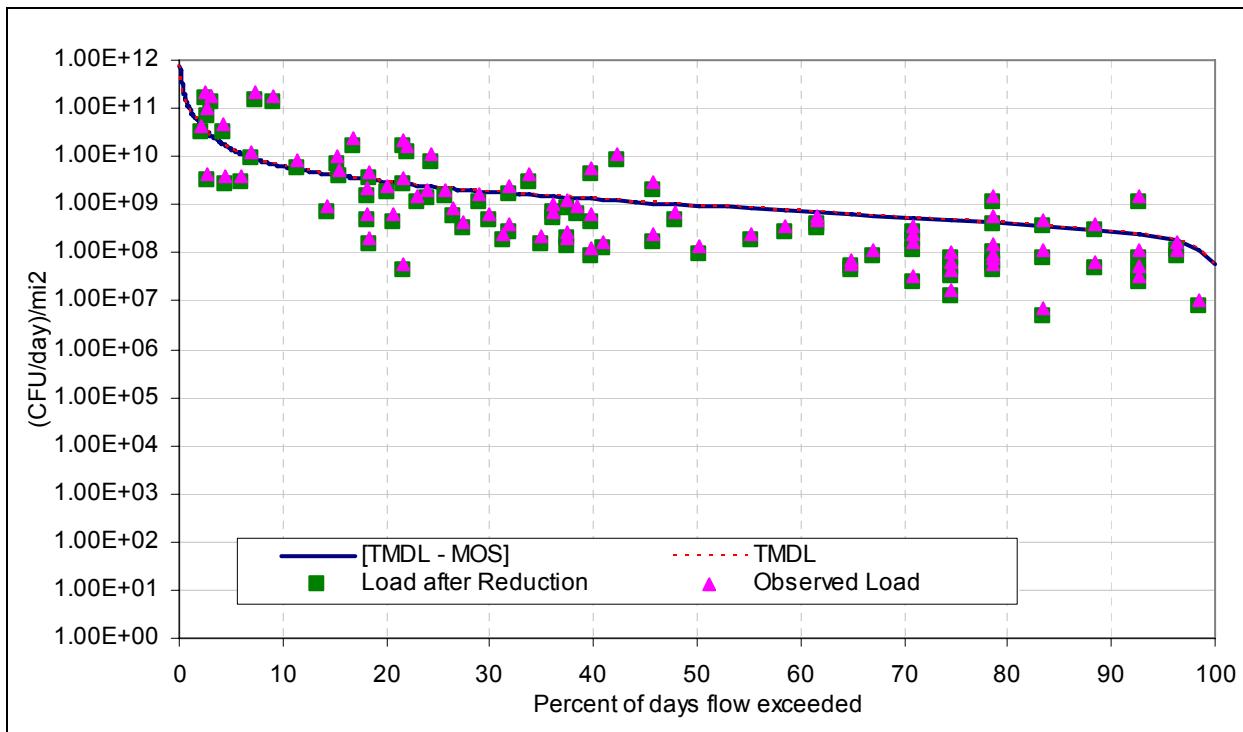


Figure M-9. Summer fecal coliform bacteria load duration curve for Kisatchie Bayou (subsegment 101103) near Lotus, Louisiana (station 42).

Table M-17. Summer allowable fecal coliform load for Kisatchie Bayou (subsegment 101103) near Lotus, Louisiana (station 42)

Season	Date	Observed flow (cfs)	Percent exceedance for observed flow	Adjusted flow for entire basin			Width for area under curves (%)	Allowable load to meet standard (CFU/day)/mi ²	Target load with MOS incorporated (CFU/day)/mi ²	Area under TMDL curve (CFU/day/mi ²)
				cfs	cfs/mi ²	cms/mi ²				
Summer	7/12/98	1	100.000	0.2286	0.007	0.000	0.00	66108472.3896	59497625.1506	0.00E+00
Summer	7/13/98	1	100.000	0.2286	0.007	0.000	0.00	66108472.3896	59497625.1506	0.00E+00
Summer	7/14/98	1	100.000	0.2286	0.007	0.000	0.00	66108472.3896	59497625.1506	0.00E+00
Summer	7/23/98	1	100.000	0.2286	0.007	0.000	0.00	66108472.3896	59497625.1506	0.00E+00
Summer	7/24/98	1	100.000	0.2286	0.007	0.000	0.00	66108472.3896	59497625.1506	0.00E+00
Summer	7/25/98	1	100.000	0.2286	0.007	0.000	0.00	66108472.3896	59497625.1506	0.00E+00
Summer	7/27/98	1	100.000	0.2286	0.007	0.000	0.00	66108472.3896	59497625.1506	0.00E+00
Summer	7/29/98	1	100.000	0.2286	0.007	0.000	0.00	66108472.3896	59497625.1506	0.00E+00
Summer	7/30/98	1	100.000	0.2286	0.007	0.000	0.00	66108472.3896	59497625.1506	0.00E+00
Summer	7/31/98	1	100.000	0.2286	0.007	0.000	0.00	66108472.3896	59497625.1506	0.00E+00
Summer	8/1/98	1	100.000	0.2286	0.007	0.000	0.00	66108472.3896	59497625.1506	0.00E+00
Summer	8/2/98	1	100.000	0.2286	0.007	0.000	0.00	66108472.3896	59497625.1506	0.00E+00
Summer	10/21/84	3570	0.400	816.0702	24.122	0.683	0.10	236007246430.7500	212406521787.6750	2.36E+08
Summer	5/18/89	4020	0.300	918.9361	27.162	0.769	0.00	265756059006.0550	239180453105.4500	0.00E+00
Summer	5/22/83	4530	0.300	1035.5176	30.608	0.867	0.00	298471379824.7340	269524241932.2600	0.00E+00
Summer	6/27/89	5100	0.300	1165.8145	34.459	0.976	0.00	337153209186.7860	30343788268.1080	0.00E+00
Summer	5/5/91	5520	0.300	1261.8228	37.297	1.056	0.10	364918767590.4040	328426890831.3640	3.65E+08
Summer	10/22/84	6120	0.200	1398.9774	41.351	1.171	0.00	404583851024.1440	364125465921.7290	0.00E+00
Summer	6/30/89	6270	0.200	1433.2661	42.365	1.200	0.00	4145001211882.5780	373056109694.3210	0.00E+00
Summer	7/1/89	6640	0.200	1517.8448	44.865	1.270	0.00	438960256666.7180	395064231000.0460	0.00E+00
Summer	5/19/89	7130	0.200	1629.8544	48.176	1.364	0.10	471353408137.6050	424218067323.8450	4.71E+08
Summer	5/21/83	9070	0.100	2073.3211	61.284	1.735	0.00	598603844573.3630	539643460116.0270	0.00E+00
Summer	6/29/89	9670	0.100	2210.4758	65.338	1.850	0.00	639268928007.1030	575342035206.3930	0.00E+00
Summer	7/2/89	10700	0.100	2445.9246	72.297	2.047	0.10	707360654568.3560	636624589111.5200	7.07E+08
Summer	6/28/89	12100	0.000	2765.9521	81.757	2.315	0.00	799912515913.7480	719921264322.3730	0.00E+00

For brevity most of the cells in this spreadsheet have been hidden.

Table M-18. Summer existing fecal coliform load and percent reduction for Kisatchie Bayou (subsegment 101103) near Lotus, Louisiana (station 42)

Season	Date	Obs FC (CFU/100mL)	Flow/unit area on sampling day (cms/mi ²)	Percent exceedance for flow on sampling day	Current fecal coliform load (CFU/day)/mi ²	Reduced fecal coliform load (CFU/day)/mi ²	Allowable load with MOS incorporated (CFU/day)/mi ²	Reduced load less than or equal to allow load?
Summer	09/23/02	1600	0.003061297	50.1	4.231E+09	9.520E+08	9.520E+08	Yes
Summer	10/21/02	1600	0.081889703	3.3	1.132E+11	2.546E+10	2.546E+10	Yes
Summer	08/19/02	300	0.003635291	44.0	9.420E+08	2.120E+08	1.130E+09	Yes
Summer	05/20/02	240	0.004783277	36.1	9.916E+08	2.231E+08	1.487E+09	Yes
Summer	07/22/02	130	0.001721980	70.8	1.934E+08	4.351E+07	5.355E+08	Yes
Summer	06/17/02	30	0.001147986	83.4	2.975E+07	6.693E+06	3.570E+08	Yes

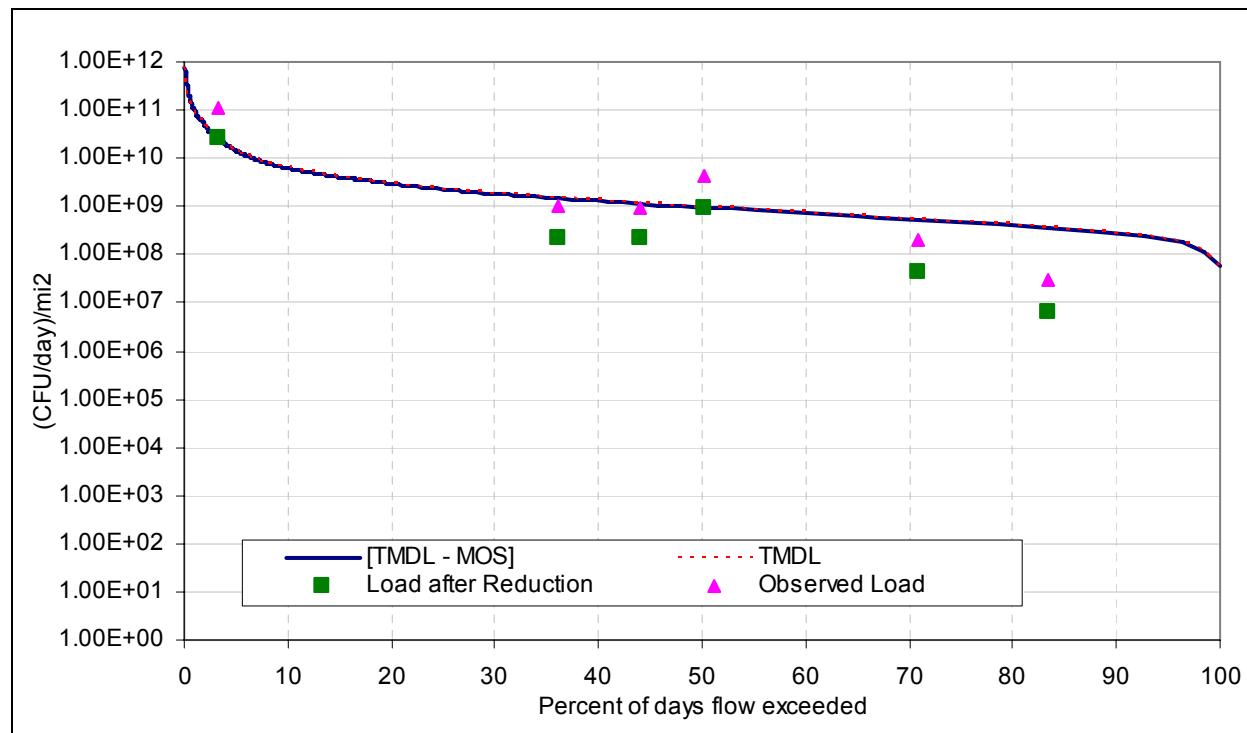
**Figure M-10. Summer fecal coliform bacteria load duration curve for Kisatchie Bayou (subsegment 101103) south of Cypress, Louisiana (station 1218).**

Table M-19. Summer allowable fecal coliform load for Kisatchie Bayou (subsegment 101103) south of Cypress, Louisiana (station 1218)

Season	Date	Observed flow (cfs)	Percent exceedance for observed flow	Adjusted flow for entire basin		Width for area under curves (%)	Allowable load to meet standard (CFU/day)/mi2	Target load with MOS incorporated (CFU/day)/mi2	Area under TMDL curve (CFU/day/mi2)
				cfs	cms/mi2				
Summer	7/12/98	1	100,000	0.2286	0.007	0.00	66108472.3896	59497625.1506	6.08E+09
Summer	7/13/98	1	100,000	0.2286	0.007	0.00	66108472.3896	59497625.1506	0.00E+00
Summer	7/14/98	1	100,000	0.2286	0.007	0.00	66108472.3896	59497625.1506	0.00E+00
Summer	7/23/98	1	100,000	0.2286	0.007	0.00	66108472.3896	59497625.1506	0.00E+00
Summer	7/24/98	1	100,000	0.2286	0.007	0.00	66108472.3896	59497625.1506	0.00E+00
Summer	7/25/98	1	100,000	0.2286	0.007	0.00	66108472.3896	59497625.1506	0.00E+00
Summer	7/27/98	1	100,000	0.2286	0.007	0.00	66108472.3896	59497625.1506	0.00E+00
Summer	7/29/98	1	100,000	0.2286	0.007	0.00	66108472.3896	59497625.1506	0.00E+00
Summer	7/30/98	1	100,000	0.2286	0.007	0.00	66108472.3896	59497625.1506	0.00E+00
Summer	7/31/98	1	100,000	0.2286	0.007	0.00	66108472.3896	59497625.1506	0.00E+00
Summer	8/1/98	1	100,000	0.2286	0.007	0.00	66108472.3896	59497625.1506	0.00E+00
Summer	8/2/98	1	100,000	0.2286	0.007	0.00	66108472.3896	59497625.1506	0.00E+00
For brevity most of the cells in this spreadsheet have been hidden.									
Summer	10/2/84	3570	0.400	816.0702	24.122	0.683	0.10	236007246430.7500	2124066521787.6750
Summer	5/18/89	4020	0.300	918.9361	27.162	0.769	0.00	265756059006.0550	23910453105.4500
Summer	5/22/83	4530	0.300	1035.5176	30.608	0.867	0.00	289471379924.7340	269524241932.2600
Summer	6/27/89	5100	0.300	1165.8145	34.959	0.976	0.00	337153209186.7860	3034373888268.1080
Summer	5/5/91	5520	0.300	1261.8228	37.297	1.056	0.10	364918767590.4040	328426830831.3640
Summer	10/22/84	6720	0.200	1398.9774	41.351	1.171	0.00	404583851024.1440	364125465921.7290
Summer	6/30/89	6270	0.200	1433.2661	42.365	1.200	0.00	414500121882.5780	373050109694.3210
Summer	7/1/89	6640	0.200	1517.8448	44.865	1.270	0.00	438960256566.7180	395064231000.0460
Summer	5/19/89	730	0.200	1629.8544	48.176	1.364	0.10	471353408137.6050	424218067323.8450
Summer	5/21/83	9070	0.100	2073.3211	61.284	1.735	0.00	589603844573.3650	539643460116.0270
Summer	6/29/89	9670	0.100	2210.4758	65.338	1.850	0.00	639268928007.1030	57743035206.9390
Summer	7/2/89	10700	0.100	2445.9246	72.297	2.047	0.10	7073606454568.3560	6366245889111.5200
Summer	6/28/89	12100	0.000	2765.9521	81.757	2.315	0.00	799912515913.7480	7199212634322.3730

For brevity most of the cells in this spreadsheet have been hidden.

Table M-20. Summer existing fecal coliform load and percent reduction for Kisatchie Bayou (subsegment 101103) south of Cypress, Louisiana (station 1218)

Season	Date	Obs FC (CFU/100mL)	Flow/unit area on sampling day (cms/mi ²)	Percent exceedance for flow on sampling day	Current fecal coliform load (CFU/day)/mi ²	Reduced fecal coliform load (CFU/day)/mi ²	Allowable load with MOS incorporated (CFU/day)/mi ²	Reduced load less than or equal to allow load?
Summer	07/13/81	9400	0.022003074	9.1	1.787E+11	1.286E+11	6.842E+09	No
Summer	08/12/91	9000	0.027551676	7.4	2.142E+11	1.542E+11	8.568E+09	No
Summer	08/12/86	3500	0.003826622	42.3	1.157E+10	8.330E+09	1.190E+09	No
Summer	09/09/91	3000	0.008609899	21.7	2.231E+10	1.606E+10	2.677E+09	No
Summer	06/10/91	2400	0.085907655	3.1	1.781E+11	1.282E+11	2.671E+10	No
Summer	05/11/81	2300	0.011671196	16.7	2.319E+10	1.670E+10	3.629E+09	No
Summer	06/08/81	2300	0.112502676	2.6	2.235E+11	1.609E+11	3.498E+10	No
Summer	09/14/81	2300	0.008418568	22.1	1.673E+10	1.204E+10	2.618E+09	No
Summer	07/12/82	2300	0.000765324	92.7	1.520E+09	1.095E+09	2.380E+08	No
Summer	06/13/94	1700	0.007461912	24.4	1.096E+10	7.889E+09	2.320E+09	No
Summer	10/13/97	1600	0.004209284	39.8	5.818E+09	4.189E+09	1.309E+09	No
Summer	10/14/85	1300	0.001339318	78.5	1.504E+09	1.083E+09	4.165E+08	No
Summer	05/10/94	1100	0.101596804	2.7	9.653E+10	6.951E+10	3.159E+10	No
Summer	07/09/84	940	0.003443959	45.7	2.796E+09	2.013E+09	1.071E+09	No
For brevity most of the cells in this spreadsheet have been hidden.								
Summer	07/11/94	50	0.004591946	37.4	1.983E+08	1.428E+08	1.428E+09	Yes
Summer	10/10/95	50	0.001530649	74.6	6.611E+07	4.760E+07	4.760E+08	Yes
Summer	05/12/97	50	0.003061297	50.1	1.322E+08	9.520E+07	9.520E+08	Yes
Summer	08/10/92	40	0.002104642	64.9	7.272E+07	5.236E+07	6.545E+08	Yes
Summer	10/14/80	33	0.000382662	98.4	1.091E+07	7.854E+06	1.190E+08	Yes
Summer	07/11/83	33	0.004209284	39.8	1.200E+08	8.639E+07	1.309E+09	Yes
Summer	10/10/83	33	0.002104642	64.9	5.999E+07	4.320E+07	6.545E+08	Yes
Summer	09/10/84	33	0.001530649	74.6	4.363E+07	3.141E+07	4.760E+08	Yes
Summer	05/12/80	23	0.010523209	18.4	2.091E+08	1.505E+08	3.272E+09	Yes
Summer	08/10/81	23	0.001721980	70.8	3.421E+07	2.463E+07	5.355E+08	Yes
Summer	08/10/93	13	0.001530649	74.6	1.719E+07	1.238E+07	4.760E+08	Yes
Summer	05/09/82	8	0.008609899	21.7	5.950E+07	4.284E+07	2.677E+09	Yes
Summer	07/09/96	7	0.001147986	83.4	6.941E+06	4.998E+06	3.570E+08	Yes

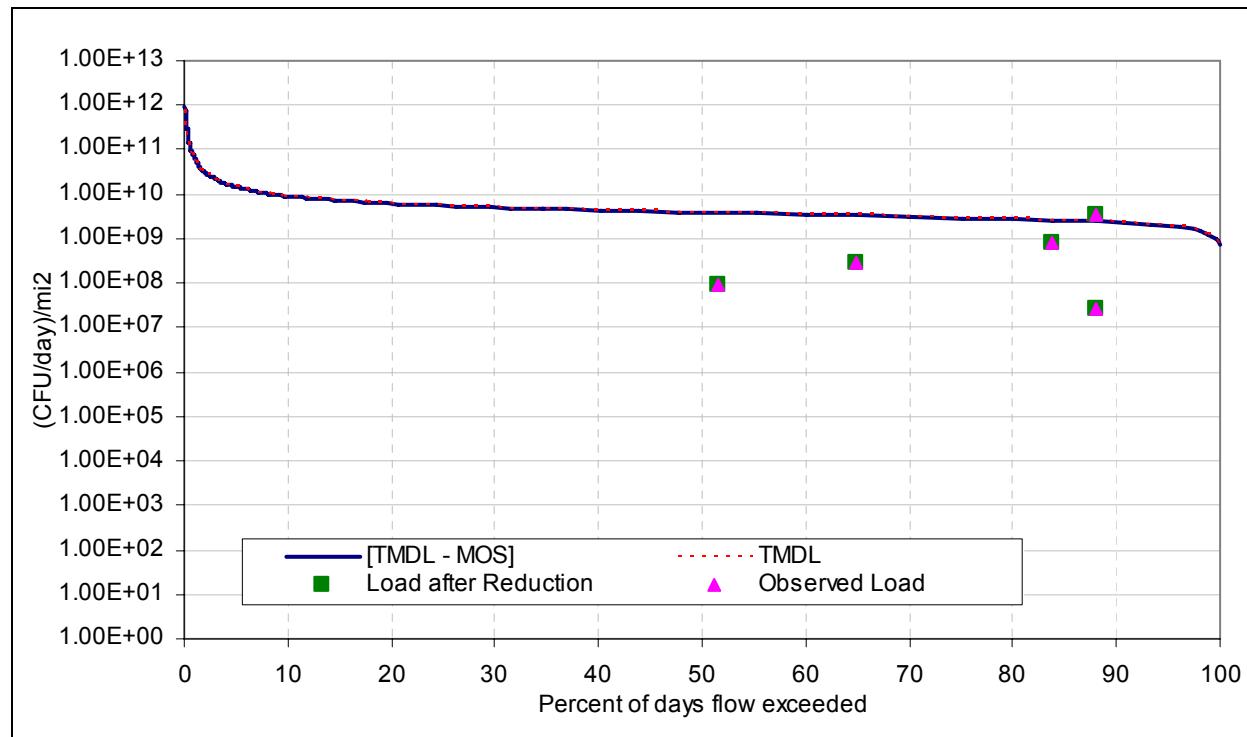
**Figure M-11. Summer fecal coliform bacteria load duration curve for Nantachie Creek (subsegment 101301) east of Montgomery, Louisiana (station 1215).**

Table M-21. Summer allowable fecal coliform load for Nantachie Creek (subsegment 101301) east of Montgomery, Louisiana (station 1215)

Season	Date	Observed flow (cfs)	Percent exceedance for observed flow	Adjusted flow for entire basin			Width for area under curves (%)	Allowable load to meet standard (CFU/day)/mi ²	Target load with MOS incorporated (CFU/day)/mi ²	Area under TMDL curve (CFU/day/mi ²)
				cfs	cfs/mi ²	cms/mi ²				
Summer	8/30/00	4	100,000	1.2541	0.078	0.002	0.00	767376777.5416	690639099.7875	8.12E+09
Summer	8/31/00	4	100,000	1.2541	0.078	0.002	0.00	767376777.5416	690639099.7875	0.00E+00
Summer	9/1/00	4	100,000	1.2541	0.078	0.002	0.00	767376777.5416	690639099.7875	0.00E+00
Summer	9/2/00	4	100,000	1.2541	0.078	0.002	0.00	767376777.5416	690639099.7875	0.00E+00
Summer	9/3/00	4	100,000	1.2541	0.078	0.002	0.00	767376777.5416	690639099.7875	0.00E+00
Summer	9/4/00	4	100,000	1.2541	0.078	0.002	0.00	767376777.5416	690639099.7875	0.00E+00
Summer	9/5/00	4	100,000	1.2541	0.078	0.002	0.00	767376777.5416	690639099.7875	0.00E+00
Summer	9/6/00	4	100,000	1.2541	0.078	0.002	0.00	767376777.5416	690639099.7875	0.00E+00
Summer	9/7/00	4	100,000	1.2541	0.078	0.002	0.20	767376777.5416	690639099.7875	1.53E+06
Summer	8/14/00	5	99,800	1.5677	0.098	0.003	0.00	959220971.9270	863298874.7343	0.00E+00
Summer	8/15/00	5	99,800	1.5677	0.098	0.003	0.00	959220971.9270	863298874.7343	0.00E+00
Summer	8/19/00	5	99,800	1.5677	0.098	0.003	0.00	959220971.9270	863298874.7343	0.00E+00
For brevity most of the cells in this spreadsheet have been hidden.										
Summer	10/29/85	1290	0.300	404.4613	25.294	0.716	0.00	247479010757.1750	222731109681.4580	0.00E+00
Summer	5/21/83	1310	0.300	410.7320	25.686	0.727	0.00	251315894644.8830	226184305180.3950	0.00E+00
Summer	6/30/89	1420	0.300	445.2210	27.843	0.788	0.00	272418756027.2780	245176880424.5500	0.00E+00
Summer	5/20/83	1630	0.300	511.0635	31.961	0.905	0.10	312706036848.2140	281435433163.3920	3.13E+08
Summer	5/19/89	1730	0.200	542.4171	33.922	0.961	0.00	331890456286.7540	298701410658.0790	0.00E+00
Summer	10/22/84	1820	0.200	570.6353	35.686	1.011	0.00	349156433781.4410	314240790403.2970	0.00E+00
Summer	6/28/89	1840	0.200	576.9060	36.078	1.022	0.00	352993317669.1490	317693985902.2340	0.00E+00
Summer	10/30/85	2360	0.200	739.9447	46.275	1.310	0.10	452752298749.5610	407477068874.6050	4.53E+08
Summer	9/3/85	2520	0.100	790.1104	49.412	1.399	0.00	483447369851.2260	435102632866.1030	0.00E+00
Summer	6/29/89	3040	0.100	953.1491	59.608	1.688	0.00	583266350931.6370	524885715838.4740	0.00E+00
Summer	5/18/89	3330	0.100	1044.0745	65.294	1.849	0.00	638841167303.4050	574957050573.0650	0.00E+00
Summer	5/19/83	4410	0.100	1382.6932	86.471	2.449	0.10	846032897239.6450	761429607515.6810	8.46E+08
Summer	10/21/84	5390	0.000	1689.9584	105.686	2.993	0.00	1034040207737.3400	930636186963.6100	0.00E+00

Table M-22. Summer existing fecal coliform load and percent reduction for Nantachie Creek (subsegment 101301) east of Montgomery, Louisiana (station 1215)

Season	Date	Obs FC (CFU/100mL)	Flow/unit area on sampling day (cms/mi ²)	Percent exceedance for flow on sampling day	Current fecal coliform load (CFU/day)/mi ²	Reduced fecal coliform load (CFU/day)/mi ²	Allowable load with MOS incorporated (CFU/day)/mi ²	Reduced load less than or equal to allow load?
Summer	07/22/02	500	0.007773294	88.1	3.357E+09	3.357E+09	2.417E+09	No
Summer	09/24/02	110	0.008328529	83.8	7.914E+08	7.914E+08	2.590E+09	Yes
Summer	06/18/02	33	0.010549471	64.9	3.007E+08	3.007E+08	3.281E+09	Yes
Summer	05/21/02	9	0.012215176	51.5	9.496E+07	9.496E+07	3.799E+09	Yes
Summer	08/20/02	4	0.007773294	88.1	2.686E+07	2.686E+07	2.417E+09	Yes

Appendix N

Load Duration Curve Summaries and Plots for Fecal Coliform Bacteria: Winter

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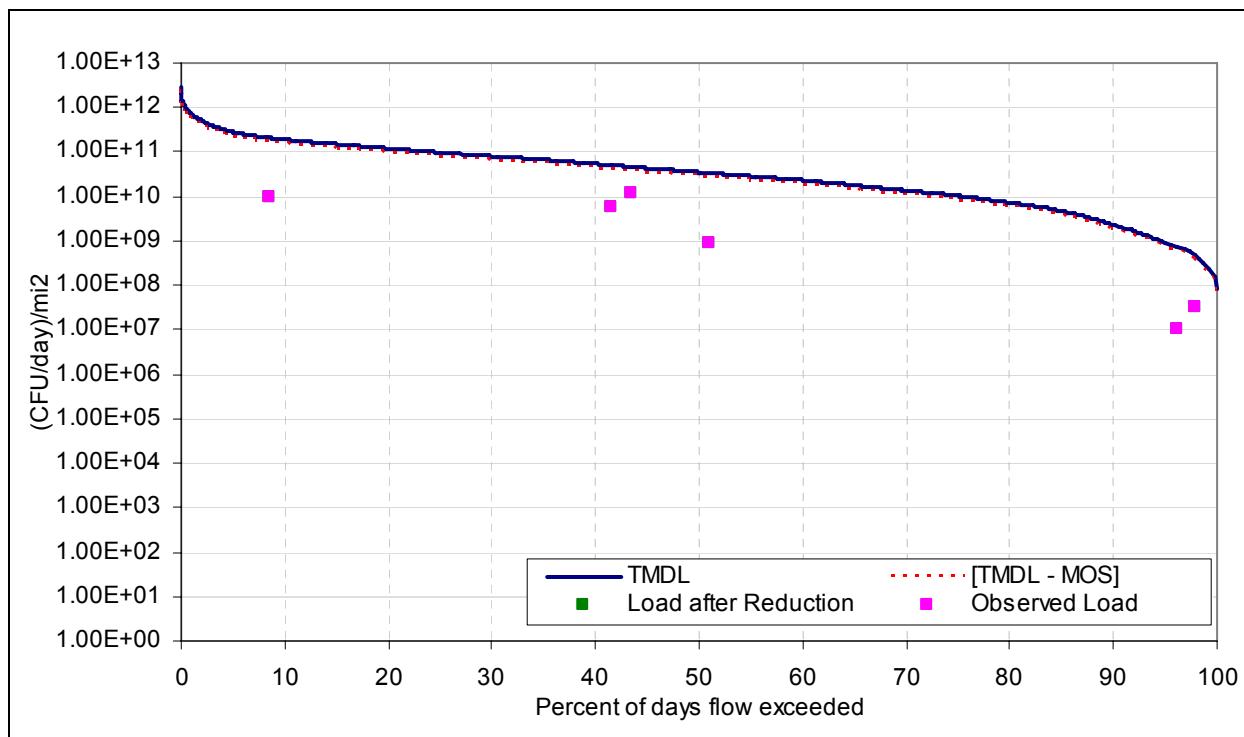


Figure N-1. Winter fecal coliform bacteria load duration curve for Kelly Bayou (subsegment 100306) at Huckaby Road, south of Hosston, Louisiana (station 1192).

Table N-1. Winter allowable fecal coliform load for Kelly Bayou (subsegment 100306) at Huckaby Road, south of Hosston, Louisiana (station 1192)

Season	Date	Observed flow (cfs)	Percent exceedance for observed flow	Adjusted flow for entire basin			Width for area under curves (%)	Allowable load to meet standard (CFU/day)/mi ²	Target load with MOS incorporated (CFU/day)/mi ²	Area under TMDL curve (CFU/day/mi ²)
				cfs	cfs/mi ²	cms/mi ²				
Winter	11/8/80	1	100.000	0.0076	0.002	0.000	0.00	80859949.6996	72773954.7297	8.08E+10
Winter	11/1/83	1	100.000	0.0076	0.002	0.000	0.00	80859949.6996	72773954.7297	0.00E+00
Winter	11/2/83	1	100.000	0.0076	0.002	0.000	0.00	80859949.6996	72773954.7297	0.00E+00
Winter	11/3/83	1	100.000	0.0076	0.002	0.000	0.00	80859949.6996	72773954.7297	0.00E+00
Winter	11/11/83	1	100.000	0.0076	0.002	0.000	0.00	80859949.6996	72773954.7297	0.00E+00
Winter	11/12/83	1	100.000	0.0076	0.002	0.000	0.00	80859949.6996	72773954.7297	0.00E+00
Winter	11/13/83	1	100.000	0.0076	0.002	0.000	0.00	80859949.6996	72773954.7297	0.00E+00
Winter	11/14/83	1	100.000	0.0076	0.002	0.000	0.00	80859949.6996	72773954.7297	0.00E+00
Winter	11/15/83	1	100.000	0.0076	0.002	0.000	0.00	80859949.6996	72773954.7297	0.00E+00
Winter	11/16/83	1	100.000	0.0076	0.002	0.000	0.00	80859949.6996	72773954.7297	0.00E+00
Winter	11/17/83	1	100.000	0.0076	0.002	0.000	0.15	80859949.6996	72773954.7297	1.24E+05
Winter	11/1/67	2	99.847	0.0152	0.003	0.000	0.00	161719899.3993	145547909.4593	0.00E+00
For brevity most of the cells in this spreadsheet have been hidden.										
Winter	4/5/97	16400	0.167	124.9525	27.107	0.768	0.00	1326103175074.0000	1193492857566.6000	0.00E+00
Winter	2/19/01	16400	0.167	124.9525	27.107	0.768	0.03	1326103175074.0000	1193492857566.6000	3.69E+08
Winter	4/16/91	16800	0.139	128.0001	27.769	0.786	0.01	1358447154953.8600	1222602439458.4700	1.89E+08
Winter	4/26/73	17400	0.125	132.5715	28.760	0.814	0.01	1406963124773.6400	1266268812296.2700	1.96E+08
Winter	4/25/74	17900	0.111	136.3810	29.587	0.838	0.00	1447393099623.4600	1302653789661.1100	0.00E+00
Winter	3/11/90	17900	0.111	136.3810	29.587	0.838	0.03	1447393099623.4600	1302653789661.1100	4.03E+08
Winter	4/15/91	18000	0.083	137.1430	29.752	0.842	0.01	1455479094593.4200	1309931185134.0800	2.03E+08
Winter	2/18/01	19000	0.070	144.7620	31.405	0.889	0.01	1536339044293.0500	1382705139863.7500	2.14E+08
Winter	4/24/74	19600	0.056	149.3334	32.397	0.917	0.01	1584855014112.8300	142636512701.5500	2.21E+08
Winter	4/30/91	20200	0.042	153.9049	33.388	0.945	0.01	1633370983932.6100	147003885539.3500	2.27E+08
Winter	3/10/90	23900	0.028	182.0954	39.504	1.119	0.01	1932552797821.2600	1739291518039.1400	2.69E+08
Winter	4/7/97	27300	0.014	208.0001	45.124	1.278	0.01	2207475626800.0200	1986728964120.0200	3.07E+08
Winter	4/6/97	34800	0.000	265.1430	57.521	1.629	0.00	2813926249547.2800	2532533624592.5500	0.00E+00

Table N-2. Winter existing fecal coliform load and percent reduction for Kelly Bayou (subsegment 100306) at Huckaby Road, south of Hosston, Louisiana (station 1192)

Season	Date	Obs FC (CFU/100mL)	Flow/unit area on sampling day (cms/mi ²)	Percent exceedance for flow on sampling day	Current fecal coliform load (CFU/day)/mi ²	Reduced fecal coliform load (CFU/day)/mi ²	Allowable load with MOS incorporated (CFU/day)/mi ²	Reduced load less than or equal to allow load?
Winter	1/8/02	500	0.026912851	43.4	1.162E+10	1.162E+10	4.185E+10	Yes
Winter	2/4/02	240	0.029253099	41.6	6.064E+09	6.064E+09	4.548E+10	Yes
Winter	11/13/02	130	0.000280830	97.9	3.154E+07	3.154E+07	4.366E+08	Yes
Winter	4/1/02	90	0.121692893	8.4	9.461E+09	9.461E+09	1.892E+11	Yes
Winter	3/4/02	50	0.019704888	50.9	8.511E+08	8.511E+08	3.064E+10	Yes
Winter	12/2/02	30	0.000421245	96.2	1.092E+07	1.092E+07	6.550E+08	Yes

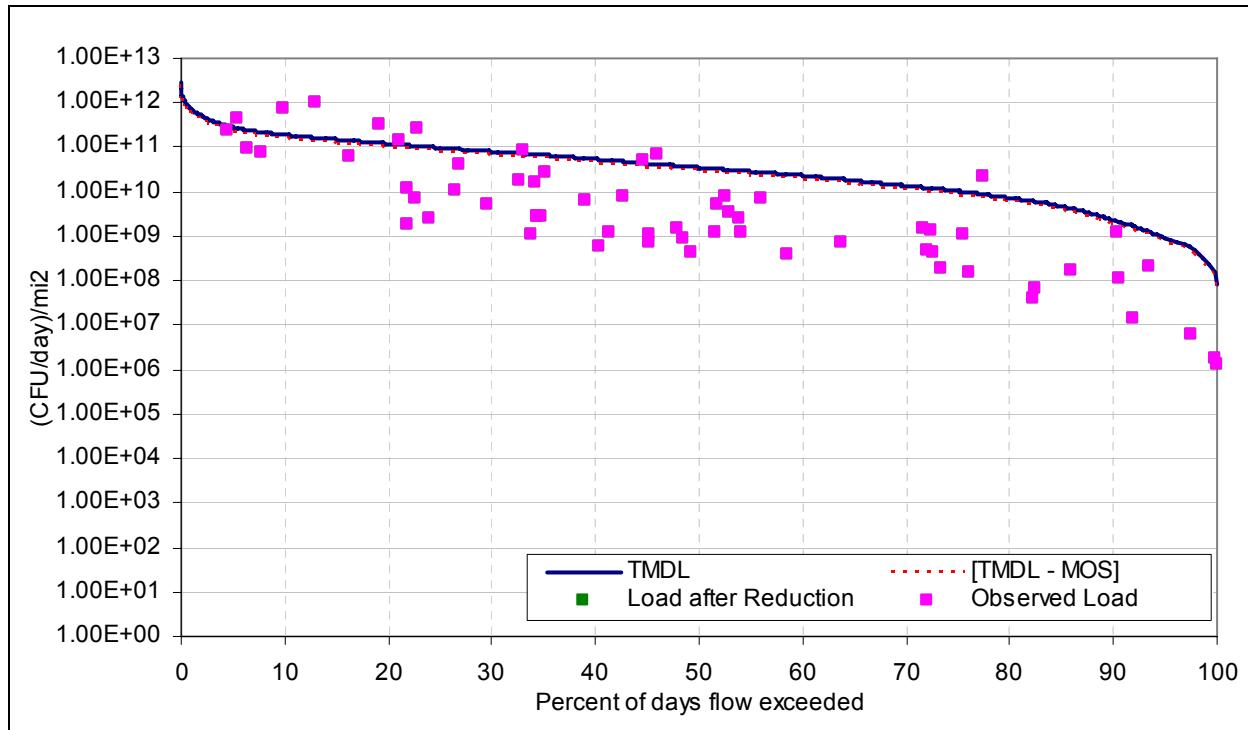
**Figure N-2. Winter fecal coliform bacteria load duration curve for Kelly Bayou (subsegment 100306) near Hosston, Louisiana (station 56).**

Table N-3. Winter allowable fecal coliform load for Kelly Bayou (subsegment 100306) near Hosston, Louisiana (station 56)

Season	Date	Observed flow (cfs)	Percent exceedance for observed flow	Adjusted flow for entire basin		Width for area under curves (%)	Allowable load to meet standard (CFU/day)/mi ²	Target load with MOs incorporated (CFU/day)/mi ²	Area under TMDL curve (CFU/day/mi ²)
				cfs	cfs/mi ²				
Winter	11/8/80	1	100.000	0.008	0.0017	0.0000	0.00	80859949.6996	72773954.7297
Winter	11/1/83	1	100.000	0.008	0.0017	0.0000	0.00	80859949.6996	72773954.7297
Winter	11/2/83	1	100.000	0.008	0.0017	0.0000	0.00	80859949.6996	72773954.7297
Winter	11/3/83	1	100.000	0.008	0.0017	0.0000	0.00	80859949.6996	72773954.7297
Winter	11/11/83	1	100.000	0.008	0.0017	0.0000	0.00	80859949.6996	72773954.7297
Winter	11/12/83	1	100.000	0.008	0.0017	0.0000	0.00	80859949.6996	72773954.7297
Winter	11/13/83	1	100.000	0.008	0.0017	0.0000	0.00	80859949.6996	72773954.7297
Winter	11/14/83	1	100.000	0.008	0.0017	0.0000	0.00	80859949.6996	72773954.7297
Winter	11/15/83	1	100.000	0.008	0.0017	0.0000	0.00	80859949.6996	72773954.7297
Winter	11/16/83	1	100.000	0.008	0.0017	0.0000	0.00	80859949.6996	72773954.7297
Winter	11/17/83	1	100.000	0.008	0.0017	0.0000	0.15	80859949.6996	72773954.7297
Winter	11/16/67	2	99.847	0.015	0.0033	0.0001	0.00	161719899.3993	145547909.4593
For brevity most of the cells in this spreadsheet have been hidden.									
Winter	4/5/97	16400	0.167	124.952	27.1074	0.7676	0.00	1326103175074.0000	1193492857566.6000
Winter	2/19/01	16400	0.167	124.952	27.1074	0.7676	0.03	1326103175074.0000	1193492857566.6000
Winter	4/16/91	16800	0.139	128.000	27.7686	0.7863	0.01	1358447154953.8600	12226024489458.4700
Winter	4/26/73	17400	0.125	132.572	28.7603	0.8144	0.01	1406963124773.6400	1266266812296.2700
Winter	4/25/74	17900	0.111	136.381	29.5888	0.8378	0.00	1447393099623.4600	1302653789661.1100
Winter	3/11/90	17900	0.111	136.381	29.5888	0.8378	0.03	1447393099623.4600	1302653789661.1100
Winter	4/15/91	18000	0.083	137.143	29.7521	0.8425	0.01	1455479094593.4200	13099311785134.0800
Winter	2/18/01	19000	0.070	144.762	31.4050	0.8893	0.01	1536339044293.0500	1382705139863.7500
Winter	4/24/74	19600	0.056	149.333	32.3967	0.9174	0.01	1584855014112.8300	1426369512701.5500
Winter	4/30/91	20200	0.042	153.905	33.3884	0.9455	0.01	1633370983932.6100	1470033885539.3500
Winter	3/10/90	23900	0.028	182.095	39.5041	1.1186	0.01	1932552797821.2600	1739297518039.1400
Winter	4/7/97	27300	0.014	208.000	45.1240	1.2778	0.01	2207476626800.0200	1986728964120.0200
Winter	4/6/97	34800	0.000	265.143	57.5207	1.6288	0.00	281392249547.2800	2532533624592.5500
0.00E+00									

Table N-4. Winter existing fecal coliform load and percent reduction for Kelly Bayou (subsegment 100306) near Hosston, Louisiana (station 56)

Season	Date	Obs FC (CFU/100mL)	Flow/unit area on sampling day (cms/mi ²)	Percent exceedance for flow on sampling day	Current fecal coliform load (CFU/day)/mi ²	Reduced fecal coliform load (CFU/day)/mi ²	Allowable load with MOS incorporated (CFU/day)/mi ²	Reduced load less than or equal to allow load?
Winter	11/17/87	13000	0.095014066	13.0	1.067E+12	1.067E+12	1.477E+11	No
Winter	4/14/80	7900	0.111395802	9.9	7.602E+11	7.602E+11	1.732E+11	No
Winter	2/13/89	5000	0.072547686	19.1	3.133E+11	3.133E+11	1.128E+11	No
Winter	11/18/85	4900	0.005101740	77.5	2.159E+10	2.159E+10	7.932E+09	No
Winter	2/17/87	4900	0.062250595	22.7	2.635E+11	2.635E+11	9.679E+10	No
Winter	4/16/79	3300	0.1586668810	5.4	4.523E+11	4.523E+11	2.467E+11	No
Winter	12/8/86	3300	0.024010944	46.0	6.844E+10	6.844E+10	3.733E+10	No
Winter	1/10/83	2400	0.025555507	44.5	5.298E+10	5.298E+10	3.973E+10	No
Winter	3/14/83	2400	0.041984048	33.1	8.704E+10	8.704E+10	6.528E+10	No
Winter	2/13/84	2400	0.066931091	21.0	1.388E+11	1.388E+11	1.041E+11	No
Winter	2/7/83	1600	0.174114446	4.5	2.406E+11	2.406E+11	2.707E+11	Yes
Winter	11/14/88	1100	0.001263734	90.3	1.201E+09	1.201E+09	1.965E+09	Yes
Winter	12/12/83	920	0.052421554	26.9	4.166E+10	4.166E+10	8.151E+10	Yes
Winter	3/12/84	920	0.081908678	16.3	6.509E+10	6.509E+10	1.274E+11	Yes
Winter	2/11/80	790	0.142755124	6.3	9.742E+10	9.742E+10	2.220E+11	Yes
Winter	11/17/86	790	0.038848116	35.1	2.651E+10	2.651E+10	6.040E+10	Yes
Winter	12/13/82	720	0.126841438	7.7	7.889E+10	7.889E+10	1.972E+11	Yes
Winter	1/14/80	490	0.016007296	56.0	6.775E+09	6.775E+09	2.489E+10	Yes
Winter	3/17/86	490	0.018441154	52.5	7.805E+09	7.805E+09	2.867E+10	Yes
Winter	4/11/88	490	0.042405293	32.7	1.795E+10	1.795E+10	6.593E+10	Yes
Winter	2/9/82	460	0.040299069	34.1	1.601E+10	1.601E+10	6.266E+10	Yes
Winter	12/8/80	330	0.000748879	93.4	2.135E+08	2.135E+08	1.164E+09	Yes
Winter	12/9/85	330	0.027895755	42.7	7.952E+09	7.952E+09	4.337E+10	Yes
Winter	2/8/88	330	0.018956008	51.8	5.403E+09	5.403E+09	2.947E+10	Yes
Winter	12/12/78	230	0.007254769	71.7	1.441E+09	1.441E+09	1.128E+10	Yes
Winter	1/8/79	230	0.053357653	26.4	1.060E+10	1.060E+10	8.296E+10	Yes
Winter	4/14/81	230	0.007020744	72.4	1.395E+09	1.395E+09	1.092E+10	Yes
Winter	4/15/86	230	0.033044301	38.9	6.565E+09	6.565E+09	5.138E+10	Yes
Winter	4/11/78	220	0.005803815	75.4	1.103E+09	1.103E+09	9.024E+09	Yes
Winter	3/9/81	220	0.018160324	52.8	3.451E+09	3.451E+09	2.824E+10	Yes
Winter	1/9/89	220	0.064590843	21.8	1.227E+10	1.227E+10	1.004E+11	Yes
Winter	3/8/82	170	0.017411445	53.9	2.557E+09	2.557E+09	2.707E+10	Yes
Winter	4/9/84	130	0.047741058	29.6	5.361E+09	5.361E+09	7.423E+10	Yes
Winter	2/11/85	130	0.062718645	22.5	7.043E+09	7.043E+09	9.752E+10	Yes
Winter	12/11/89	110	0.001216929	90.5	1.156E+08	1.156E+08	1.892E+09	Yes
Winter	12/13/88	80	0.039784215	34.4	2.749E+09	2.749E+09	6.186E+10	Yes
Winter	12/17/79	79	0.007114354	72.0	4.855E+08	4.855E+08	1.106E+10	Yes
Winter	1/12/81	79	0.002480663	85.9	1.693E+08	1.693E+08	3.857E+09	Yes
Winter	1/9/84	79	0.011186385	63.7	7.634E+08	7.634E+08	1.739E+10	Yes
Winter	2/17/86	79	0.022372770	47.8	1.527E+09	1.527E+09	3.479E+10	Yes
Winter	1/13/87	79	0.039924630	34.3	2.724E+09	2.724E+09	6.208E+10	Yes
Winter	3/10/87	79	0.039269360	34.8	2.680E+09	2.680E+09	6.106E+10	Yes
Winter	12/14/87	79	0.017317835	54.1	1.182E+09	1.182E+09	2.693E+10	Yes
Winter	1/14/85	70	0.019190033	51.6	1.160E+09	1.160E+09	2.984E+10	Yes
Winter	4/13/87	70	0.006973939	72.5	4.217E+08	4.217E+08	1.084E+10	Yes
Winter	4/10/89	50	0.059442298	23.9	2.567E+09	2.567E+09	9.242E+10	Yes
Winter	3/14/79	49	0.024900238	45.2	1.054E+09	1.054E+09	3.872E+10	Yes
Winter	4/11/83	49	0.029487124	41.3	1.248E+09	1.248E+09	4.585E+10	Yes
Winter	11/13/84	49	0.021483476	48.5	9.093E+08	9.093E+08	3.340E+10	Yes
Winter	3/10/80	33	0.014415927	58.4	4.109E+08	4.109E+08	2.241E+10	Yes
Winter	4/12/82	33	0.005616595	76.0	1.601E+08	1.601E+08	8.733E+09	Yes
Winter	11/14/83	33	0.000046805	100.0	1.334E+06	1.334E+06	7.277E+07	Yes
Winter	12/10/84	33	0.024806628	45.2	7.071E+08	7.071E+08	3.857E+10	Yes
Winter	1/14/86	33	0.0066464304	73.4	1.895E+08	1.895E+08	1.033E+10	Yes
Winter	3/14/88	33	0.064590843	21.8	1.841E+09	1.841E+09	1.004E+11	Yes
Winter	3/13/89	30	0.041047949	33.7	1.064E+09	1.064E+09	6.382E+10	Yes
Winter	11/13/78	23	0.000093610	99.9	1.860E+06	1.860E+06	1.455E+08	Yes
Winter	2/9/81	23	0.003510372	82.5	6.974E+07	6.974E+07	5.458E+09	Yes
Winter	11/16/81	23	0.000327635	97.4	6.509E+06	6.509E+06	5.094E+08	Yes
Winter	3/11/85	23	0.020875012	49.3	4.147E+08	4.147E+08	3.246E+10	Yes
Winter	4/8/85	23	0.030984883	40.3	6.156E+08	6.156E+08	4.818E+10	Yes
Winter	11/15/82	17	0.000982904	91.9	1.443E+07	1.443E+07	1.528E+09	Yes
Winter	1/11/82	13	0.003557177	82.3	3.994E+07	3.994E+07	5.531E+09	Yes

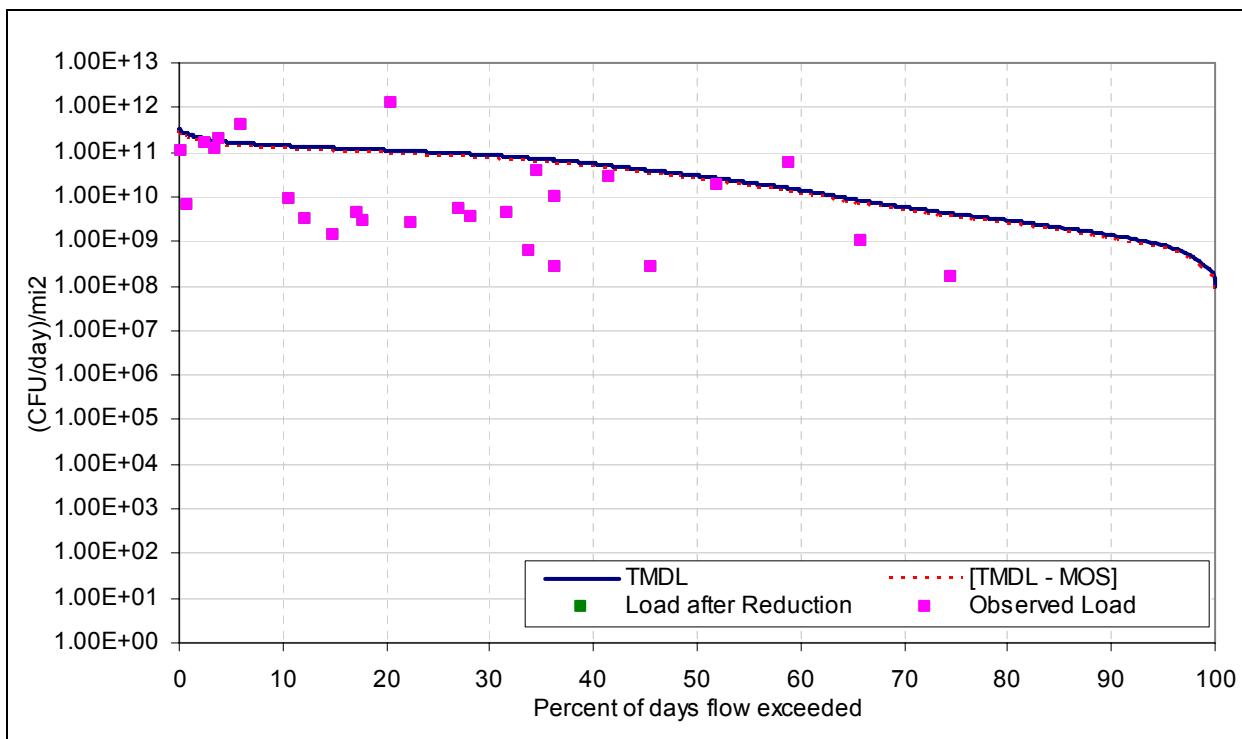


Figure N-3. Winter fecal coliform bacteria load duration curve for Flat River (subsegment 100406) east of Taylortown, Louisiana (station 272).

Table N-5. Winter allowable fecal coliform load for Flat River (subsegment 100406) east of Taylortown, Louisiana (station 272)

Season	Date	Observed flow (cfs)	Percent exceedance for observed flow	Adjusted flow for entire basin		Width for area under curves (%)	Allowable load to meet standard (CFU/day)/mi ²	Target load with MOS incorporated (CFU/day)/mi ²	Area under TMDL curve (CFU/day/mi ²)
				cfs	cfs/mi ²				
Winter	10/4/82	2	100.000	0.0223	0.002	0.00	99837284.8332	8983556.3499	5.52E+10 0.00E+00
Winter	10/5/82	2	100.000	0.0223	0.002	0.00	99837284.8332	8983556.3499	0.00E+00
Winter	10/6/82	2	100.000	0.0223	0.002	0.04	99837284.8332	89835556.3499	4.00E+04 0.00E+00
Winter	9/18/82	3	99.960	0.0334	0.003	0.00	149755927.2498	134780334.5249	0.00E+00
Winter	9/19/82	3	99.960	0.0334	0.003	0.00	149755927.2498	134780334.5249	0.00E+00
Winter	10/1/82	3	99.960	0.0334	0.003	0.00	149755927.2498	134780334.5249	0.00E+00
Winter	10/2/82	3	99.960	0.0334	0.003	0.00	149755927.2498	134780334.5249	0.00E+00
Winter	10/3/82	3	99.960	0.0334	0.003	0.00	149755927.2498	134780334.5249	0.00E+00
Winter	9/24/87	3	99.960	0.0334	0.003	0.00	149755927.2498	134780334.5249	0.00E+00
Winter	9/25/87	3	99.960	0.0334	0.003	0.00	149755927.2498	134780334.5249	0.00E+00
Winter	9/26/87	3	99.960	0.0334	0.003	0.00	149755927.2498	134780334.5249	0.00E+00
Winter	9/27/87	3	99.960	0.0334	0.003	0.12	149755927.2498	134780334.5249	1.80E+05
For brevity most of the cells in this spreadsheet have been hidden.									
Winter	5/5/97	5820	0.187	64.7758	5.939	0.168	0.04	290526498864.6760	261473848978.2090
Winter	5/4/91	5870	0.147	65.3323	5.990	0.170	0.01	293022430985.5070	263720187886.9560
Winter	5/6/91	5890	0.134	65.5549	6.010	0.170	0.01	294020803833.8390	264618723450.4550
Winter	4/9/97	5900	0.120	65.6662	6.020	0.170	0.01	294519990258.0050	265067991232.2040
Winter	5/4/97	5910	0.107	65.7775	6.031	0.171	0.01	295019176682.1710	265517259013.9540
Winter	5/5/91	5970	0.094	66.4453	6.092	0.173	0.01	298014295227.1680	268212865704.4510
Winter	4/8/97	6020	0.080	67.0018	6.143	0.174	0.01	300510227347.9980	27045204613.1990
Winter	4/16/91	6130	0.067	68.2261	6.255	0.177	0.01	306001278013.8260	275401150212.4430
Winter	4/7/97	6190	0.053	68.8939	6.316	0.179	0.01	308996396558.8220	278096756902.9400
Winter	4/6/97	6370	0.040	70.8973	6.500	0.184	0.01	317987752193.8120	286183576974.4310
Winter	4/13/91	6500	0.027	72.3441	6.633	0.188	0.01	324471175707.9720	292024058137.1740
Winter	4/14/91	6620	0.013	73.6797	6.755	0.191	0.01	330461412797.9650	297415271518.1680
Winter	4/15/91	6630	0.000	73.7910	6.765	0.192	0.00	330960599222.1310	297864539299.9180

Table N-6. Winter existing fecal coliform load and percent reduction for Flat River (subsegment 100406) east of Taylortown, Louisiana (station 272)

Season	Date	Obs FC (CFU/100mL)	Flow/unit area on sampling day (cms/mi2)	Percent exceedance for flow on sampling day	Current fecal coliform load (CFU/day)/mi2	Reduced fecal coliform load (CFU/day)/mi2	Allowable load with MOS incorporated (CFU/day)/mi2	Reduced load less than or equal to allow load?
Winter	12/10/91	22000	0.064146673	20.4	1.219E+12	1.219E+12	9.974E+10	No
Winter	12/14/93	7000	0.009015208	58.8	5.451E+10	5.451E+10	1.402E+10	No
Winter	02/12/90	5000	0.092752622	6.0	4.006E+11	4.006E+11	1.442E+11	No
Winter	04/09/90	2300	0.103154786	3.8	2.049E+11	2.049E+11	1.604E+11	No
Winter	04/09/02	1600	0.113268000	2.5	1.565E+11	1.565E+11	1.761E+11	Yes
Winter	12/09/97	1400	0.015140927	51.9	1.831E+10	1.831E+10	2.354E+10	Yes
Winter	02/18/97	1300	0.105755327	3.4	1.188E+11	1.188E+11	1.644E+11	Yes
Winter	04/12/94	1100	0.041319704	34.5	3.926E+10	3.926E+10	6.425E+10	Yes
Winter	12/13/94	1100	0.029183847	41.5	2.773E+10	2.773E+10	4.538E+10	Yes
Winter	04/16/91	700	0.177125724	0.1	1.071E+11	1.071E+11	2.754E+11	Yes
Winter	03/19/02	300	0.038719163	36.2	1.003E+10	1.003E+10	6.020E+10	Yes
Winter	12/10/02	240	0.004796553	65.8	9.944E+08	9.944E+08	7.458E+09	Yes
Winter	04/06/92	130	0.080038867	10.7	8.988E+09	8.988E+09	1.244E+11	Yes
Winter	12/09/96	110	0.054611357	27.0	5.189E+09	5.189E+09	8.491E+10	Yes
Winter	02/19/02	110	0.047098684	31.6	4.475E+09	4.475E+09	7.323E+10	Yes
Winter	02/10/92	80	0.052877663	28.1	3.654E+09	3.654E+09	8.222E+10	Yes
Winter	11/18/02	80	0.002427171	74.6	1.677E+08	1.677E+08	3.774E+09	Yes
Winter	02/10/98	70	0.068769857	17.1	4.158E+09	4.158E+09	1.069E+11	Yes
Winter	02/04/91	50	0.077149378	12.1	3.332E+09	3.332E+09	1.200E+11	Yes
Winter	02/14/95	49	0.068191959	17.7	2.886E+09	2.886E+09	1.060E+11	Yes
Winter	04/15/97	49	0.154298755	0.7	6.531E+09	6.531E+09	2.399E+11	Yes
Winter	04/14/98	49	0.060968235	22.3	2.581E+09	2.581E+09	9.480E+10	Yes
Winter	01/15/02	23	0.072237245	14.9	1.435E+09	1.435E+09	1.123E+11	Yes
Winter	04/04/95	17	0.042764449	33.8	6.280E+08	6.280E+08	6.649E+10	Yes
Winter	12/10/90	14	0.022422441	45.5	2.712E+08	2.712E+08	3.486E+10	Yes
Winter	02/08/94	8	0.038719163	36.2	2.676E+08	2.676E+08	6.020E+10	Yes

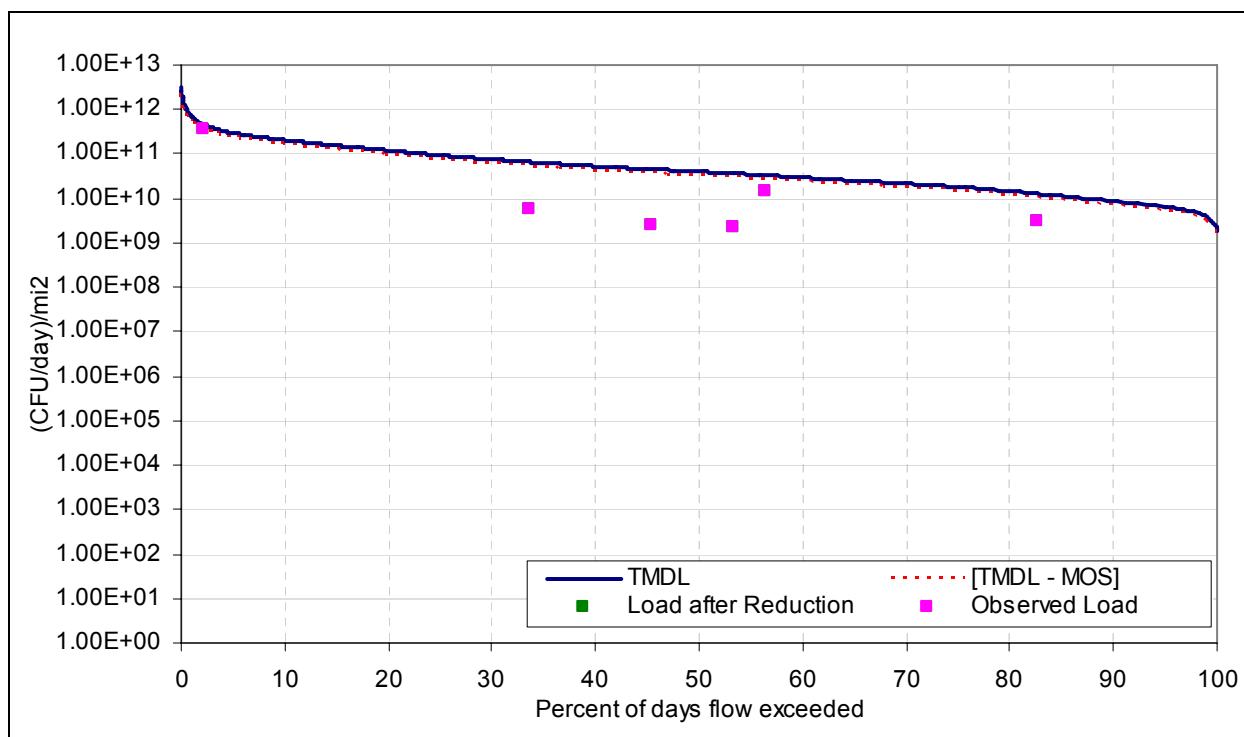


Figure N-4. Winter fecal coliform bacteria load duration curve for Castor Creek (subsegment 100707) at Highway 507, southwest of Castor, Louisiana (station 1189).

Table N-7. Winter allowable fecal coliform load for Castor Creek (subsegment 100707) at Highway 507, southwest of Castor, Louisiana (station 1189)

Season	Date	Observed flow (cfs)	Percent exceedance for observed flow	Adjusted flow for entire basin			Width for area under curves (%)	Allowable load to meet standard (CFU/day)/mi ²	Target load with MOS incorporated (CFU/day)/mi ²	Area under TMDL curve (CFU/day/mi ²)
				cfs	cfs/mi ²	cms/mi ²				
Winter	11/1/64	6	100.000	0.1324	0.039	0.001	0.00	1905984528.6342	1715386075.7708	8.57E+10
Winter	11/2/64	6	100.000	0.1324	0.039	0.001	0.00	1905984528.6342	1715386075.7708	0.00E+00
Winter	11/3/64	6	100.000	0.1324	0.039	0.001	0.00	1905984528.6342	1715386075.7708	0.00E+00
Winter	11/4/64	6	100.000	0.1324	0.039	0.001	0.00	1905984528.6342	1715386075.7708	0.00E+00
Winter	11/5/64	6	100.000	0.1324	0.039	0.001	0.00	1905984528.6342	1715386075.7708	0.00E+00
Winter	11/3/67	6	100.000	0.1324	0.039	0.001	0.08	1905984528.6342	1715386075.7708	1.58E+06
Winter	11/2/67	7	99.917	0.1545	0.045	0.001	0.00	2223648616.7400	20011283755.0660	0.00E+00
Winter	11/4/67	7	99.917	0.1545	0.045	0.001	0.00	2223648616.7400	20011283755.0660	0.00E+00
Winter	11/5/67	7	99.917	0.1545	0.045	0.001	0.00	2223648616.7400	20011283755.0660	0.00E+00
Winter	11/6/67	7	99.917	0.1545	0.045	0.001	0.00	2223648616.7400	20011283755.0660	0.00E+00
Winter	11/7/67	7	99.917	0.1545	0.045	0.001	0.00	2223648616.7400	20011283755.0660	0.00E+00
Winter	11/17/78	7	99.917	0.1545	0.045	0.001	0.00	2223648616.7400	20011283755.0660	0.00E+00
Winter	11/27/78	7	99.917	0.1545	0.045	0.001	0.00	2223648616.7400	20011283755.0660	0.00E+00
For brevity most of the cells in this spreadsheet have been hidden.										
Winter	4/24/95	5010	0.166	110.5897	32.532	0.921	0.01	1591497081409.5900	1432347373268.6300	2.20E+08
Winter	3/2/01	5500	0.152	121.4059	35.714	1.011	0.01	1747152484581.3900	1572437236123.2500	2.42E+08
Winter	12/14/01	5590	0.138	123.3925	36.299	1.028	0.01	1775742252510.9000	1598168027259.8700	2.46E+08
Winter	3/3/01	5780	0.125	127.5886	37.532	1.063	0.01	1836098429250.9800	165248856325.8900	2.54E+08
Winter	12/12/83	5930	0.111	130.8976	38.506	1.090	0.01	1883748042466.8400	1695373238220.1600	2.61E+08
Winter	3/8/95	5950	0.097	131.3391	38.636	1.094	0.01	1890101324228.9500	1701091191806.0600	2.62E+08
Winter	1/31/99	6370	0.083	140.6101	41.364	1.171	0.01	2023520241233.3500	1821165217110.0200	2.80E+08
Winter	4/30/91	6420	0.069	141.7138	41.688	1.180	0.01	2039403445638.6400	1835463101074.7700	2.82E+08
Winter	2/20/91	6660	0.055	147.0115	43.247	1.225	0.01	2115642826784.0100	1904078544105.6000	2.93E+08
Winter	12/28/82	6720	0.042	148.3359	43.636	1.236	0.01	2134702672070.3500	1921232404863.3100	2.95E+08
Winter	12/13/01	6970	0.028	153.8544	45.260	1.282	0.01	2214118694096.7700	199270824687.1000	3.06E+08
Winter	1/30/99	8590	0.014	189.6139	55.779	1.580	0.01	2728734516828.0200	2455861065145.2200	3.78E+08
Winter	4/23/95	9730	0.000	214.7781	63.182	1.789	0.00	3090871577268.5200	2781784419541.6700	0.00E+00

Table N-8. Winter existing fecal coliform load and percent reduction for Castor Creek (subsegment 100707) at Highway 507, southwest of Castor, Louisiana (station 1189)

Season	Date	Obs FC (CFU/100mL)	Flow/unit area on sampling day (cms/mi ²)	Percent exceedance for flow on sampling day	Current fecal coliform load (CFU/day)/mi ²	Reduced fecal coliform load (CFU/day)/mi ²	Allowable load with MOS incorporated (CFU/day)/mi ²	Reduced load less than or equal to allow load?
Winter	04/09/02	1600	0.264782338	2.1	3.659E+11	3.659E+11	4.117E+11	Yes
Winter	12/09/02	900	0.019307045	56.3	1.501E+10	1.501E+10	3.002E+10	Yes
Winter	11/12/02	500	0.007355065	82.7	3.177E+09	3.177E+09	1.144E+10	Yes
Winter	03/18/02	170	0.038430214	33.5	5.643E+09	5.643E+09	5.975E+10	Yes
Winter	01/14/02	130	0.021145812	53.3	2.375E+09	2.375E+09	3.288E+10	Yes
Winter	02/18/02	110	0.026110481	45.3	2.481E+09	2.481E+09	4.060E+10	Yes

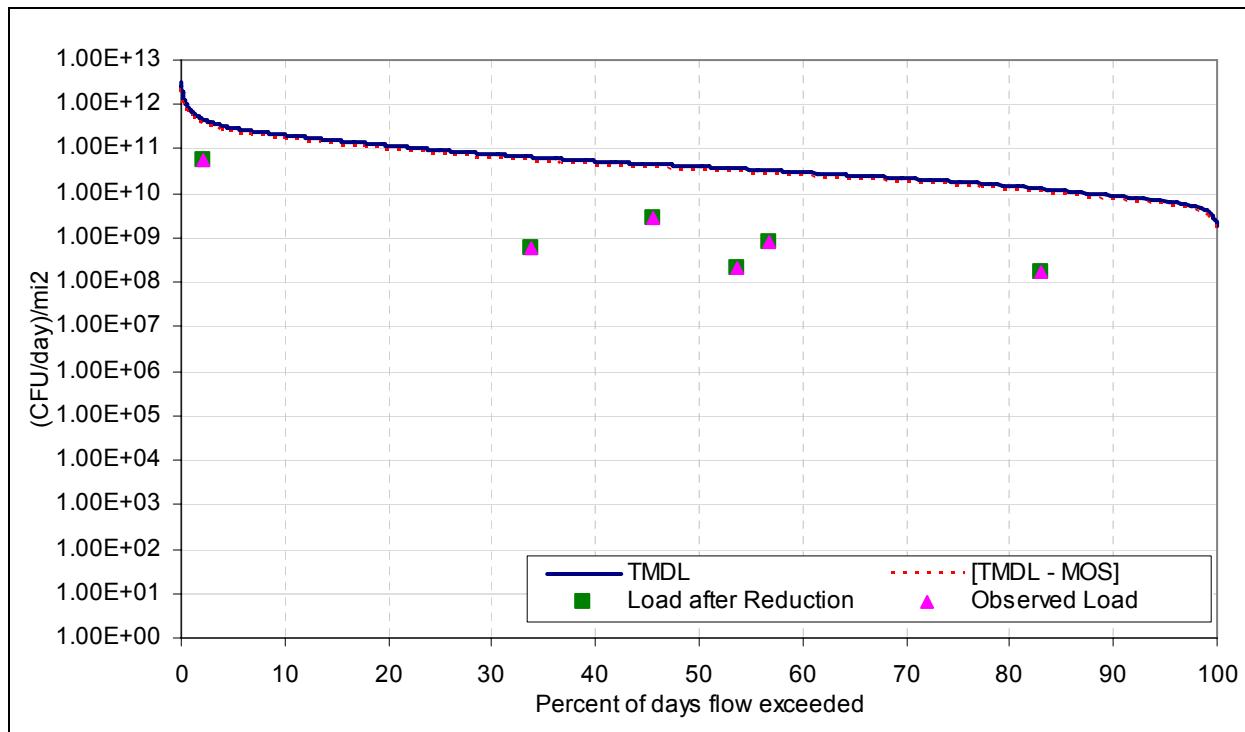
**Figure N-5. Winter fecal coliform bacteria load duration curve for Grand Bayou (subsegment 100709) at Highway 507, north of Fairview Alpha, Louisiana (station 1190).**

Table N-9. Winter allowable fecal coliform load for Grand Bayou (subsegment 100709) at Highway 507, north of Fairview Alpha, Louisiana (station 1190)

Season	Date	Observed flow (cfs)	Percent exceedance for observed flow	Adjusted flow for entire basin		Width for area under curves (%)	Allowable load to meet standard (CFU/day)/mi ²	Target load with MOS incorporated (CFU/day)/mi ²	Area under TMDL curve (CFU/day/mi ²)
				cfs	cfs/mi ²	cms/mi ²			
Winter	11/1/64	6	100.000	0.4903	0.039	0.001	0.00	1905984528.6342	1715386075.7708
Winter	11/2/64	6	100.000	0.4903	0.039	0.001	0.00	1905984528.6342	1715386075.7708
Winter	11/3/64	6	100.000	0.4903	0.039	0.001	0.00	1905984528.6342	1715386075.7708
Winter	11/4/64	6	100.000	0.4903	0.039	0.001	0.00	1905984528.6342	1715386075.7708
Winter	11/5/64	6	100.000	0.4903	0.039	0.001	0.00	1905984528.6342	1715386075.7708
Winter	11/3/67	6	100.000	0.4903	0.039	0.001	0.08	1905984528.6342	1715386075.7708
Winter	11/2/67	7	99.917	0.5720	0.045	0.001	0.00	2223648616.7400	2001283755.0660
Winter	11/4/67	7	99.917	0.5720	0.045	0.001	0.00	2223648616.7400	2001283755.0660
Winter	11/5/67	7	99.917	0.5720	0.045	0.001	0.00	2223648616.7400	2001283755.0660
Winter	11/6/67	7	99.917	0.5720	0.045	0.001	0.00	2223648616.7400	2001283755.0660
Winter	11/17/78	7	99.917	0.5720	0.045	0.001	0.00	2223648616.7400	2001283755.0660
Winter	11/27/78	7	99.917	0.5720	0.045	0.001	0.00	2223648616.7400	2001283755.0660
Winter	4/24/95	50.10	0.167	409.4055	32.532	0.921	0.01	1591497081409.5900	1432347373268.6300
Winter	3/2/01	5500	0.153	449.4471	35.714	1.011	0.01	1747152484581.3900	1572437236123.2500
Winter	12/14/01	5590	0.139	456.8017	36.299	1.028	0.01	1775742252510.9000	1598168027259.8100
Winter	3/3/01	5780	0.125	472.3281	37.532	1.063	0.01	1836098429250.9800	1652488586325.8900
Winter	12/12/83	5930	0.111	484.5857	38.506	1.090	0.01	1883748042466.8400	16953373238220.1600
Winter	3/8/95	5950	0.097	486.2201	38.636	1.094	0.01	1890101324228.9500	1701091191806.0600
Winter	1/3/199	6370	0.083	520.5415	41.364	1.171	0.01	2023520241233.3500	1821168217110.0200
Winter	4/30/91	6420	0.070	524.6274	41.688	1.180	0.01	2039403445638.6400	1835563101074.7700
Winter	2/20/91	6660	0.056	544.2396	43.247	1.225	0.01	2115642826784.0100	1904078544105.6000
Winter	12/28/82	6720	0.042	549.1427	43.636	1.236	0.01	2134702672070.3500	1921232404863.3100
Winter	12/13/01	6970	0.028	569.5721	45.260	1.282	0.01	2214118694036.7700	199270824667.1000
Winter	1/30/99	8590	0.014	701.9547	55.779	1.580	0.01	2728734516328.0200	2455861065145.2200
Winter	4/23/95	9730	0.000	795.1129	63.182	1.789	0.00	3090871577268.5200	2781784419541.6700

For brevity most of the cells in this spreadsheet have been hidden.

Table N-10. Winter existing fecal coliform load and percent reduction for Grand Bayou (subsegment 100709) at Highway 507, north of Fairview Alpha, Louisiana (station 1190)

Season	Date	Obs FC (CFU/100mL)	Flow/unit area on sampling day (cms/mi ²)	Percent exceedance for flow on sampling day	Current fecal coliform load (CFU/day)/mi ²	Reduced fecal coliform load (CFU/day)/mi ²	Allowable load with MOS incorporated (CFU/day)/mi ²	Reduced load less than or equal to allow load?
Winter	04/09/02	240	0.264782338	2.2	5.489E+10	5.489E+10	4.117E+11	Yes
Winter	02/18/02	130	0.026110481	45.5	2.932E+09	2.932E+09	4.060E+10	Yes
Winter	12/09/02	50	0.019307045	56.7	8.339E+08	8.339E+08	3.002E+10	Yes
Winter	11/12/02	26	0.007355065	83.1	1.652E+08	1.652E+08	1.144E+10	Yes
Winter	03/18/02	17	0.038430214	33.7	5.643E+08	5.643E+08	5.975E+10	Yes
Winter	01/14/02	11	0.021145812	53.6	2.009E+08	2.009E+08	3.288E+10	Yes

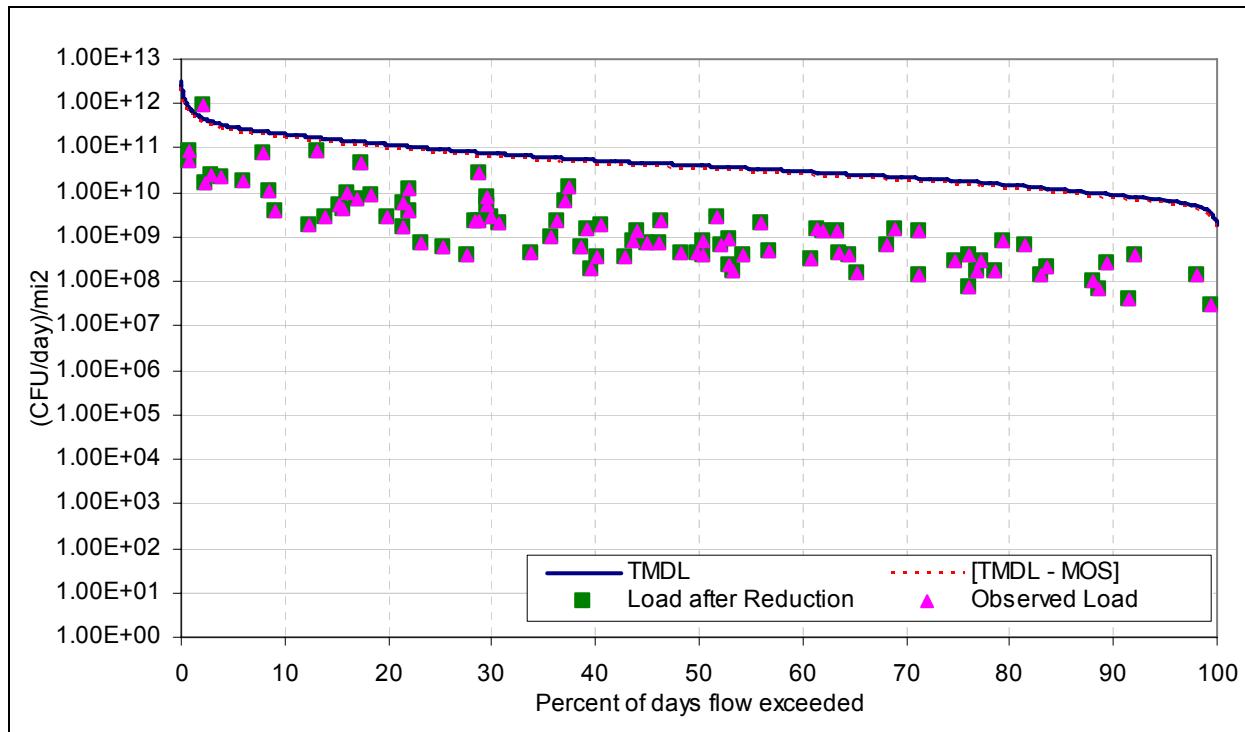
**Figure N-6. Winter fecal coliform bacteria load duration curve for Saline Bayou (subsegment 100801) near Goldonna, Louisiana (station 75).**

Table N-11. Winter allowable fecal coliform load for Saline Bayou (subsegment 100801) near Goldonna, Louisiana (station 75)

Season	Date	Observed flow (cfs)	Percent exceedance for observed flow	Adjusted flow for entire basin		Width for area under curves (%)	Allowable load to meet standard (CFU/day)/ml12	Target load with MOS incorporated (CFU/day)/ml12	Area under TMDL curve (CFU/day/ml12)
		cfs	cfs/ml12	cfs	cms/ml12				
Winter	11/1/64	6	100.000	1.0932	0.039	0.001	0.00	1715386075.7708	8.61E+10
Winter	11/2/64	6	100.000	1.0932	0.039	0.001	0.00	1715386075.7708	0.00E+00
Winter	11/3/64	6	100.000	1.0932	0.039	0.001	0.00	1715386075.7708	0.00E+00
Winter	11/4/64	6	100.000	1.0932	0.039	0.001	0.00	1715386075.7708	0.00E+00
Winter	11/5/64	6	100.000	1.0932	0.039	0.001	0.00	1715386075.7708	0.00E+00
Winter	11/3/67	6	100.000	1.0932	0.039	0.001	0.08	1715386075.7708	1.59E+06
Winter	11/2/67	7	99.917	1.2754	0.045	0.001	0.00	2001283755.0660	0.00E+00
Winter	11/4/67	7	99.917	1.2754	0.045	0.001	0.00	2001283755.0660	0.00E+00
Winter	11/5/67	7	99.917	1.2754	0.045	0.001	0.00	2001283755.0660	0.00E+00
Winter	11/6/67	7	99.917	1.2754	0.045	0.001	0.00	2001283755.0660	0.00E+00
Winter	11/1/78	7	99.917	1.2754	0.045	0.001	0.00	2001283755.0660	0.00E+00
Winter	11/2/78	7	99.917	1.2754	0.045	0.001	0.00	2001283755.0660	0.00E+00
Winter	4/2/95	5010	0.167	912.8477	32.532	0.921	0.01	1432347373268.6300	2.21E+08
Winter	3/2/01	5500	0.153	1002.1282	37.714	1.011	0.01	1572437236123.2500	2.43E+08
Winter	12/14/01	5590	0.139	1018.5227	36.299	1.028	0.01	1598168027259.8100	2.47E+08
Winter	3/3/01	5780	0.125	1053.1457	37.532	1.063	0.01	165248856325.8900	2.55E+08
Winter	12/12/83	5930	0.111	1080.4764	38.506	1.090	0.01	1695373238220.1600	2.62E+08
Winter	3/8/95	5950	0.097	1084.1205	38.636	1.094	0.01	1701091191806.0600	2.63E+08
Winter	1/31/99	6370	0.083	1160.6467	41.364	1.171	0.01	1823520241233.3500	2.82E+08
Winter	4/3/91	6420	0.070	1169.7569	41.688	1.180	0.01	18354633101074.7700	2.84E+08
Winter	2/20/91	6660	0.056	1213.4862	43.247	1.225	0.01	1904078544105.6000	2.94E+08
Winter	12/28/82	6720	0.042	1224.4185	43.636	1.236	0.01	192123240703.5000	2.97E+08
Winter	12/13/01	6970	0.028	1269.9698	45.260	1.282	0.01	19221418994096.7700	3.08E+08
Winter	1/30/99	8590	0.014	1565.1421	55.779	1.580	0.01	2455861065145.2200	3.80E+08
Winter	4/23/95	9730	0.000	1772.8559	63.182	1.789	0.00	2781784419541.6700	0.00E+00

For brevity most of the cells in this spreadsheet have been hidden.

Table N-12. Winter existing fecal coliform load and percent reduction for Saline Bayou (subsegment 100801) near Goldonna, Louisiana (station 75)

Season	Date	Obs FC (CFU/100mL)	Flow/unit area on sampling day (cms/mi2)	Percent exceedance for flow on sampling day	Current fecal coliform load (CFU/day)/mi2	Reduced fecal coliform load (CFU/day)/mi2	Allowable load with MOS incorporated (CFU/day)/mi2	Reduced load less than or equal to allow load?
Winter	02/12/85	9200	0.112492192	2.1	8.940E+11	8.940E+11	1.749E+11	No
Winter	02/16/87	2400	0.041893644	13.2	8.685E+10	8.685E+10	6.514E+10	No
Winter	01/15/91	1600	0.057720132	8.0	7.977E+10	7.977E+10	8.975E+10	Yes
Winter	12/10/91	1600	0.033980400	17.4	4.696E+10	4.696E+10	5.283E+10	Yes
Winter	04/12/94	1600	0.019550367	28.8	2.702E+10	2.702E+10	3.040E+10	Yes
Winter	02/05/91	1100	0.014197290	37.5	1.349E+10	1.349E+10	2.207E+10	Yes
Winter	12/13/94	500	0.026765384	22.0	1.156E+10	1.156E+10	4.162E+10	Yes
Winter	01/10/95	500	0.014352452	37.1	6.199E+09	6.199E+09	2.232E+10	Yes
Winter	04/14/86	490	0.018929721	29.6	8.012E+09	8.012E+09	2.943E+10	Yes
Winter	04/14/80	460	0.208692411	0.7	8.292E+10	8.292E+10	3.245E+11	Yes
Winter	12/12/78	330	0.009464860	51.7	2.698E+09	2.698E+09	1.472E+10	Yes
Winter	03/09/87	330	0.019084882	29.5	5.440E+09	5.440E+09	2.967E+10	Yes
Winter	11/15/88	300	0.005120334	71.3	1.327E+09	1.327E+09	7.961E+09	Yes
Winter	04/16/91	300	0.203261753	0.8	5.267E+10	5.267E+10	3.160E+11	Yes

For brevity most of the cells in this spreadsheet have been hidden.

Winter	11/05/79	33	0.002327425	88.7	6.634E+07	6.634E+07	3.619E+09	Yes
Winter	04/12/83	33	0.012955997	40.2	3.693E+08	3.693E+08	2.014E+10	Yes
Winter	01/12/88	33	0.011947447	42.8	3.406E+08	3.406E+08	1.858E+10	Yes
Winter	01/09/90	30	0.022576019	25.3	5.850E+08	5.850E+08	3.510E+10	Yes
Winter	01/11/94	30	0.005120334	71.3	1.327E+08	1.327E+08	7.961E+09	Yes
Winter	11/15/94	30	0.006128885	65.3	1.588E+08	1.588E+08	9.529E+09	Yes
Winter	11/19/96	30	0.009154537	52.8	2.372E+08	2.372E+08	1.423E+10	Yes
Winter	02/09/98	30	0.016214392	33.7	4.202E+08	4.202E+08	2.521E+10	Yes
Winter	04/13/81	23	0.002017101	91.5	4.007E+07	4.007E+07	3.136E+09	Yes
Winter	02/04/02	23	0.020403756	27.7	4.054E+08	4.054E+08	3.172E+10	Yes
Winter	04/12/88	21	0.008999375	53.2	1.632E+08	1.632E+08	1.399E+10	Yes
Winter	01/13/86	20	0.004266945	76.0	7.372E+07	7.372E+07	6.634E+09	Yes
Winter	03/15/83	17	0.013188740	39.6	1.937E+08	1.937E+08	2.051E+10	Yes

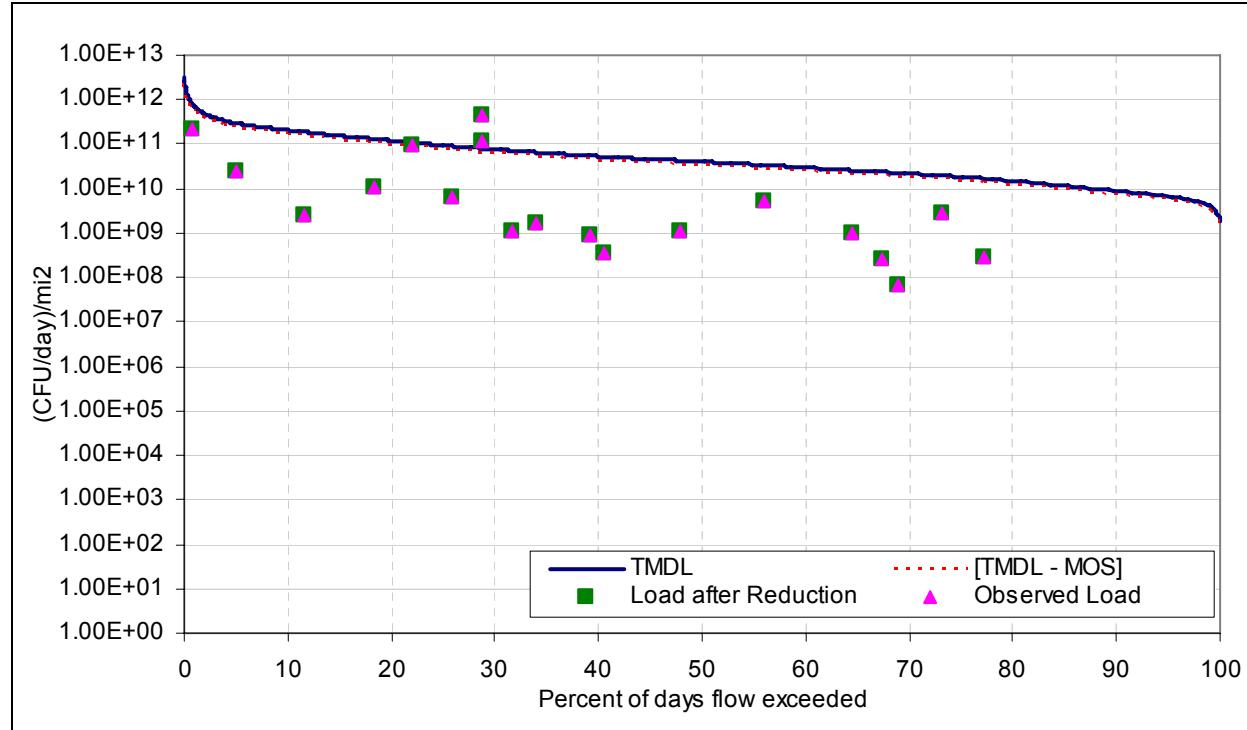


Figure N-7. Winter fecal coliform bacteria load duration curve for Saline Bayou (subsegment 100801) east of Bienville, Louisiana (station 284).

Table N-13. Winter allowable fecal coliform load for Saline Bayou (subsegment 100801) east of Bienville, Louisiana (station 284)

Season	Date	Observed flow (cfs)	Percent exceedance for observed flow	Adjusted flow for entire basin			Width for area under curves (%)	Allowable load to meet standard (CFU/day)/mi ²	Target load with MOS incorporated (CFU/day)/mi ²	Area under TMDL curve (CFU/day/mi ²)
				cfs	cfs/mi ²	cms/mi ²				
Winter	11/1/64	6	100.000	1.0932	0.039	0.001	0.00	1905984528.6342	1715386075.7708	8.61E+10 0.00E+00
Winter	11/2/64	6	100.000	1.0932	0.039	0.001	0.00	1905984528.6342	1715386075.7708	0.00E+00
Winter	11/3/64	6	100.000	1.0932	0.039	0.001	0.00	1905984528.6342	1715386075.7708	0.00E+00
Winter	11/4/64	6	100.000	1.0932	0.039	0.001	0.00	1905984528.6342	1715386075.7708	0.00E+00
Winter	11/5/64	6	100.000	1.0932	0.039	0.001	0.00	1905984528.6342	1715386075.7708	0.00E+00
Winter	11/6/64	6	100.000	1.0932	0.039	0.001	0.08	1905984528.6342	1715386075.7708	1.59E+06
Winter	11/7/64	7	99.917	1.2754	0.045	0.001	0.00	2223648616.7400	2001283755.0660	0.00E+00
Winter	11/14/67	7	99.917	1.2754	0.045	0.001	0.00	2223648616.7400	2001283755.0660	0.00E+00
Winter	11/5/67	7	99.917	1.2754	0.045	0.001	0.00	2223648616.7400	2001283755.0660	0.00E+00
Winter	11/6/67	7	99.917	1.2754	0.045	0.001	0.00	2223648616.7400	2001283755.0660	0.00E+00
Winter	11/17/78	7	99.917	1.2754	0.045	0.001	0.00	2223648616.7400	2001283755.0660	0.00E+00
Winter	11/27/78	7	99.917	1.2754	0.045	0.001	0.00	2223648616.7400	2001283755.0660	0.00E+00
Winter	4/24/95	5010	0.167	912.8477	32.532	0.921	0.01	1591497081409.5900	1432347373268.6300	2.21E+08
Winter	3/2/01	5500	0.153	1002.1282	35.714	1.011	0.01	17471524184581.3900	1572437236123.2500	2.43E+08
Winter	12/14/01	5590	0.139	1018.5267	36.299	1.028	0.01	1775742252510.9000	1598168027259.8100	2.47E+08
Winter	3/3/01	5780	0.125	1053.1457	37.532	1.063	0.01	1836098429250.9800	1652488386325.8900	2.55E+08
Winter	12/12/83	5930	0.111	1080.4764	38.506	1.090	0.01	1883748042466.8400	1695373238220.1600	2.62E+08
Winter	3/8/95	5950	0.097	1084.1205	38.636	1.094	0.01	1890101324228.9500	1701091191806.0600	2.63E+08
Winter	1/31/99	6370	0.083	1160.6467	41.364	1.171	0.01	2023520241233.3500	1821168217110.0200	2.82E+08
Winter	4/30/91	6420	0.070	1169.7569	41.688	1.180	0.01	20394034456338.6400	1835463101074.7700	2.84E+08
Winter	2/20/91	6660	0.056	1213.4862	43.247	1.225	0.01	21156422826784.0100	1904078544105.6000	2.94E+08
Winter	12/28/82	6720	0.042	1224.4185	43.636	1.236	0.01	2134702672070.3500	1921232404863.3100	2.97E+08
Winter	12/13/01	6970	0.028	1269.9698	45.286	1.282	0.01	2214116864096.7700	199270624687.1000	3.08E+08
Winter	1/30/99	8590	0.014	1565.1421	55.779	1.580	0.01	2728734516828.0200	2455861065145.2200	3.80E+08
Winter	4/23/95	9730	0.000	1772.8559	63.182	1.789	0.00	3090871577268.5200	2781784419544.16700	0.00E+00

For brevity most of the cells in this spreadsheet have been hidden.

Table N-14. Winter existing fecal coliform load and percent reduction for Saline Bayou (subsegment 100801) east of Bienville, Louisiana (station 284)

Season	Date	Obs FC (CFU/100mL)	Flow/unit area on sampling day (cms/mi ²)	Percent exceedance for flow on sampling day	Current fecal coliform load (CFU/day)/mi ²	Reduced fecal coliform load (CFU/day)/mi ²	Allowable load with MOS incorporated (CFU/day)/mi ²	Reduced load less than or equal to allow load?
Winter	12/09/91	11000	0.046336909	28.8	4.403E+11	4.403E+11	7.205E+10	No
Winter	04/12/94	2800	0.046336909	28.8	1.121E+11	1.121E+11	7.205E+10	No
Winter	12/13/94	1700	0.063437435	22.0	9.315E+10	9.315E+10	9.863E+10	Yes
Winter	04/16/91	500	0.481756753	0.8	2.081E+11	2.081E+11	7.491E+11	Yes
Winter	04/06/92	300	0.019674799	55.9	5.099E+09	5.099E+09	3.059E+10	Yes
Winter	12/13/93	280	0.011400351	73.2	2.757E+09	2.757E+09	1.773E+10	Yes
Winter	02/13/90	170	0.170637506	5.1	2.506E+10	2.506E+10	2.653E+11	Yes
Winter	02/10/92	170	0.076676552	18.3	1.126E+10	1.126E+10	1.192E+11	Yes
Winter	12/09/97	140	0.052404838	25.9	6.337E+09	6.337E+09	8.148E+10	Yes
Winter	12/10/96	79	0.014894006	64.4	1.016E+09	1.016E+09	2.316E+10	Yes
Winter	02/07/94	49	0.024823344	47.8	1.051E+09	1.051E+09	3.860E+10	Yes
Winter	02/10/98	49	0.038062461	34.0	1.611E+09	1.611E+09	5.918E+10	Yes
Winter	04/15/97	33	0.031810656	39.1	9.068E+08	9.068E+08	4.946E+10	Yes
Winter	04/14/98	33	0.009745461	77.3	2.778E+08	2.778E+08	1.515E+10	Yes
Winter	04/09/90	30	0.041556117	31.7	1.077E+09	1.077E+09	6.461E+10	Yes
Winter	02/18/97	27	0.109038838	11.6	2.543E+09	2.543E+09	1.695E+11	Yes
Winter	04/04/95	22	0.013790747	67.4	2.621E+08	2.621E+08	2.144E+10	Yes
Winter	02/14/95	14	0.030339643	40.6	3.669E+08	3.669E+08	4.717E+10	Yes
Winter	12/10/90	6	0.013055240	69.0	6.766E+07	6.766E+07	2.030E+10	Yes

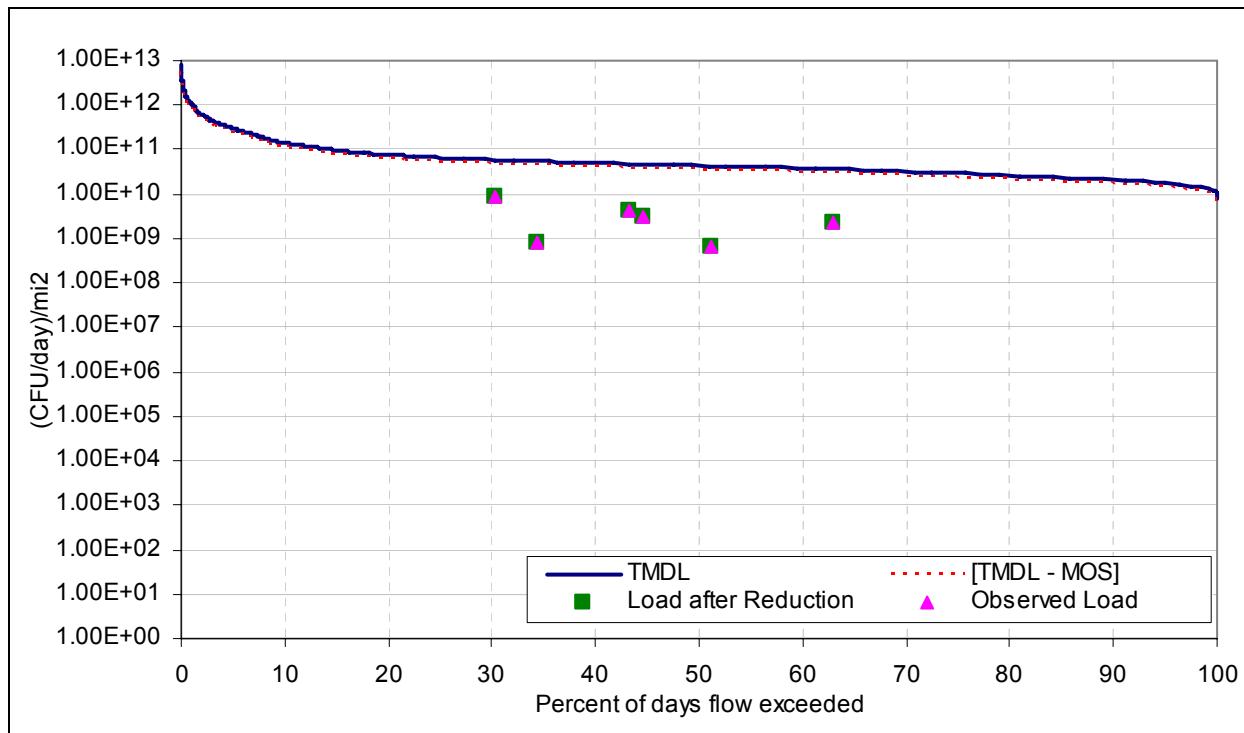
**Figure N-8. Winter fecal coliform bacteria load duration curve for Rigolette Bayou (subsegment 100901) northwest of Pineville, Louisiana (station 1220).**

Table N-15. Winter allowable fecal coliform load for Rigolette Bayou (subsegment 100901) northwest of Pineville, Louisiana (station 1220)

Season	Date	Observed flow (cfs)	Percent exceedance for observed flow	Adjusted flow for entire basin			Width for area under curves (%)	Allowable load to meet standard (CFU/day)/mi ²	Target load with MOS incorporated (CFU/day)/mi ²	Area under TMDL curve (CFU/day/mi ²)
				cfs	cf/s/mi ²	cms/mi ²				
Winter	11/1/00	8	100.000	1.0881	0.157	0.004	0.00	7673767775.4163	6906390997.8747	9.11E+10
Winter	11/2/00	8	100.000	1.0881	0.157	0.004	0.05	7673767775.4163	6906390997.8747	0.00E+00
Winter	11/3/00	10	99.951	1.3601	0.196	0.006	0.02	9592209719.2704	8632988747.3433	3.74E+06
Winter	11/4/00	11	99.927	1.4961	0.216	0.006	0.00	10551430691.1974	9496287622.0777	2.33E+06
Winter	11/13/00	11	99.927	1.4961	0.216	0.006	0.00	10551430691.1974	9496287622.0777	0.00E+00
Winter	11/14/00	11	99.927	1.4961	0.216	0.006	0.00	10551430691.1974	9496287622.0777	0.00E+00
Winter	11/15/00	11	99.927	1.4961	0.216	0.006	0.10	10551430691.1974	9496287622.0777	0.00E+00
Winter	11/11/82	12	99.830	1.6321	0.235	0.007	0.00	11510651663.1244	10359586496.8120	1.03E+07
Winter	11/7/82	12	99.830	1.6321	0.235	0.007	0.00	11510651663.1244	10359586496.8120	0.00E+00
Winter	11/8/82	12	99.830	1.6321	0.235	0.007	0.00	11510651663.1244	10359586496.8120	0.00E+00
Winter	11/9/82	12	99.830	1.6321	0.235	0.007	0.00	11510651663.1244	10359586496.8120	0.00E+00
Winter	11/10/82	12	99.830	1.6321	0.235	0.007	0.00	11510651663.1244	10359586496.8120	0.00E+00
Winter	2/13/97	2160	0.292	293.7742	42.353	1.199	0.02	2071917299362.4000	18647255669426.1600	5.04E+08
Winter	1/28/94	2170	0.268	295.1343	42.549	1.205	0.02	2081509509081.6700	1873358558173.5000	5.07E+08
Winter	12/12/98	2680	0.243	384.4977	52.549	1.488	0.02	2570712204764.4500	2313640984288.0100	6.26E+08
Winter	3/5/84	2740	0.219	372.6581	53.725	1.521	0.02	2628265463080.0800	2365433916772.0700	6.40E+08
Winter	3/2/01	3410	0.195	463.7825	66.863	1.893	0.02	3270943514271.1900	2943849162844.0700	7.96E+08
Winter	11/29/01	3500	0.170	476.0231	68.627	1.943	0.02	3357273401744.6200	3021546061570.1600	8.17E+08
Winter	4/23/95	3760	0.146	511.3848	73.725	2.088	0.02	3606670854445.6500	3246003769001.0900	8.78E+08
Winter	12/27/82	3840	0.122	522.2653	75.294	2.132	0.00	3683408332199.8200	3315067678979.8300	0.00E+00
Winter	4/29/91	3840	0.122	522.2653	75.294	2.132	0.05	368340832199.8200	3315067678979.8300	1.79E+09
Winter	12/26/82	3890	0.073	529.0656	76.275	2.160	0.02	373136380796.1700	3358232522716.5500	9.08E+08
Winter	2/12/84	4870	0.049	662.3321	95.490	2.704	0.02	4671406133284.6600	4204265519956.2000	1.14E+09
Winter	3/7/95	5650	0.024	768.4372	110.784	3.137	0.02	5419593491387.7500	4877633642248.9800	1.32E+09
Winter	11/16/87	8610	0.000	1171.0167	168.824	4.781	0.00	8258892568291.7800	7433003311462.6000	0.00E+00

For brevity most of the cells in this spreadsheet have been hidden.

Table N-16. Winter existing fecal coliform load and percent reduction for Rigolette Bayou (subsegment 100901) northwest of Pineville, Louisiana (station 1220)

Season	Date	Obs FC (CFU/100mL)	Flow/unit area on sampling day (cms/mi ²)	Percent exceedance for flow on sampling day	Current fecal coliform load (CFU/day)/mi ²	Reduced fecal coliform load (CFU/day)/mi ²	Allowable load with MOS incorporated (CFU/day)/mi ²	Reduced load less than or equal to allow load?
Winter	12/16/02	300	0.033869353	30.3	8.777E+09	8.777E+09	5.266E+10	Yes
Winter	01/28/02	170	0.027761765	43.3	4.077E+09	4.077E+09	4.316E+10	Yes
Winter	04/15/02	130	0.027206529	44.6	3.055E+09	3.055E+09	4.230E+10	Yes
Winter	11/19/02	130	0.021098941	62.9	2.369E+09	2.369E+09	3.281E+10	Yes
Winter	02/25/02	30	0.031648412	34.4	8.201E+08	8.201E+08	4.921E+10	Yes
Winter	03/25/02	30	0.024985588	51.1	6.475E+08	6.475E+08	3.885E+10	Yes

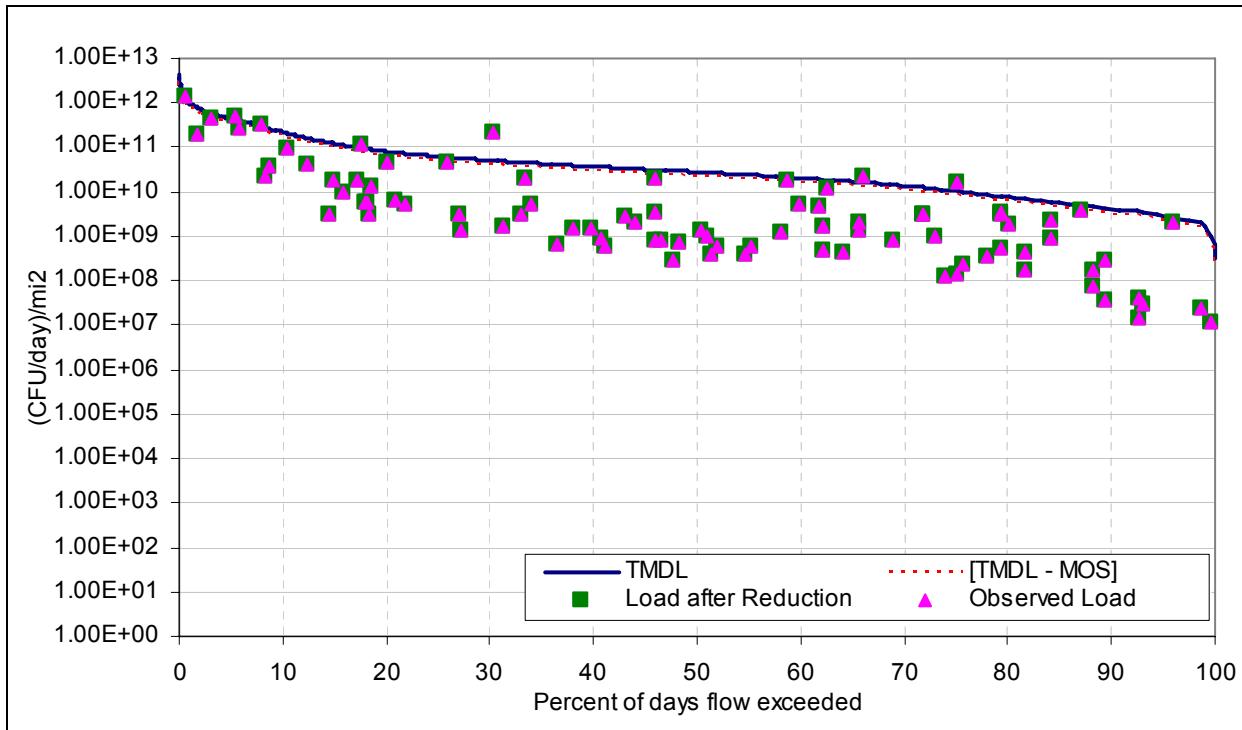
**Figure N-9. Winter fecal coliform bacteria load duration curve for Kisatchie Bayou (subsegment 101103) near Lotus, Louisiana (station 42).**

Table N-17. Winter allowable fecal coliform load for Kisatchie Bayou (subsegment 101103) near Lotus, Louisiana (station 42)

Season	Date	Observed flow (cfs)	Percent exceedance for observed flow	Adjusted flow for entire basin			Width for area under curves (%)	Allowable load to meet standard (CFU/day)/mi ²	Target load with MOs incorporated (CFU/day)/mi ²	Area under TMDL curve (CFU/day/mi ²)
				cfs	cfs/mi ²	cms/mi ²				
Winter	11/1/00	1	100.000	0.2286	0.007	0.000	0.00	330542361.9478	297488125.7530	8.84E+10 0.00E+00
Winter	11/2/00	1	100.000	0.2286	0.007	0.000	0.05	330542361.9478	297488125.7530	1.76E+05 0.00E+00
Winter	11/1/80	2	99.947	0.4572	0.014	0.000	0.00	661084723.8957	594976251.5061	0.00E+00
Winter	11/12/80	2	99.947	0.4572	0.014	0.000	0.00	661084723.8957	594976251.5061	0.00E+00
Winter	11/7/81	2	99.947	0.4572	0.014	0.000	0.00	661084723.8957	594976251.5061	0.00E+00
Winter	11/8/81	2	99.947	0.4572	0.014	0.000	0.00	661084723.8957	594976251.5061	0.00E+00
Winter	11/17/81	2	99.947	0.4572	0.014	0.000	0.00	661084723.8957	594976251.5061	0.00E+00
Winter	11/18/81	2	99.947	0.4572	0.014	0.000	0.00	661084723.8957	594976251.5061	0.00E+00
Winter	11/19/81	2	99.947	0.4572	0.014	0.000	0.00	661084723.8957	594976251.5061	0.00E+00
Winter	11/20/81	2	99.947	0.4572	0.014	0.000	0.00	661084723.8957	594976251.5061	0.00E+00
Winter	11/21/81	2	99.947	0.4572	0.014	0.000	0.00	661084723.8957	594976251.5061	0.00E+00
Winter	11/22/81	2	99.947	0.4572	0.014	0.000	0.00	661084723.8957	594976251.5061	0.00E+00
Winter	11/30/99	5390	0.320	1232.1059	36.419	1.031	0.03	178162330898.8000	1603460997808.9200	4.75E+08
Winter	3/14/99	5630	0.294	1286.9678	38.041	1.077	0.03	1860953497766.2800	1674858147989.6500	4.97E+08
Winter	1/8/98	5890	0.267	1346.4015	39.797	1.127	0.03	1946894511872.7200	1752205060685.4500	5.20E+08
Winter	1/21/90	5960	0.240	1362.4028	40.270	1.140	0.03	1970032477209.0700	1773029229488.1600	5.26E+08
Winter	11/30/01	6000	0.214	1371.5465	40.541	1.148	0.03	1983254.171686.9800	17849283754518.2800	5.29E+08
Winter	1/29/99	6380	0.187	1458.4111	43.108	1.221	0.03	2108860269227.1500	1897974242304.4400	5.63E+08
Winter	1/15/98	6580	0.160	1504.1293	44.459	1.259	0.03	2174968741616.7200	1957471867455.0500	5.80E+08
Winter	1/14/89	6860	0.133	1568.1348	46.351	1.313	0.03	2267520602962.1100	2040768542665.9000	6.05E+08
Winter	12/27/82	7540	0.107	1723.5768	50.946	1.443	0.03	2492289409086.6400	2243060468177.9700	6.65E+08
Winter	11/29/01	7840	0.080	1792.1541	52.973	1.500	0.03	2591452117670.9900	2332306905903.8900	6.92E+08
Winter	1/7/98	8610	0.053	1968.1692	58.176	1.647	0.03	284596736370.8100	2561372762733.7300	7.60E+08
Winter	12/28/82	10200	0.027	2331.6290	68.919	1.952	0.03	3371532091867.8600	3034373882681.0800	9.00E+08
Winter	1/30/99	13900	0.000	3177.4160	93.919	2.660	0.00	4594538831074.8300	4135084947967.3500	0.00E+00

For brevity most of the cells in this spreadsheet have been hidden.

Table N-18. Winter existing fecal coliform load and percent reduction for Kisatchie Bayou (subsegment 101103) near Lotus, Louisiana (station 42)

Season	Date	Obs FC (CFU/100mL)	Flow/unit area on sampling day (cms/mi ²)	Percent exceedance for flow on sampling day	Current fecal coliform load (CFU/day)/mi ²	Reduced fecal coliform load (CFU/day)/mi ²	Allowable load with MOS incorporated (CFU/day)/mi ²	Reduced load less than or equal to allow load?
Winter	01/28/02	500	0.025064372	35.0	1.083E+10	1.083E+10	3.897E+10	Yes
Winter	11/19/02	500	0.012819182	57.6	5.537E+09	5.537E+09	1.993E+10	Yes
Winter	04/15/02	240	0.020663757	41.1	4.284E+09	4.284E+09	3.213E+10	Yes
Winter	12/16/02	240	0.038074885	24.0	7.893E+09	7.893E+09	5.920E+10	Yes
Winter	03/25/02	170	0.009757885	65.1	1.433E+09	1.433E+09	1.517E+10	Yes
Winter	02/25/02	80	0.017793791	46.5	1.230E+09	1.230E+09	2.767E+10	Yes

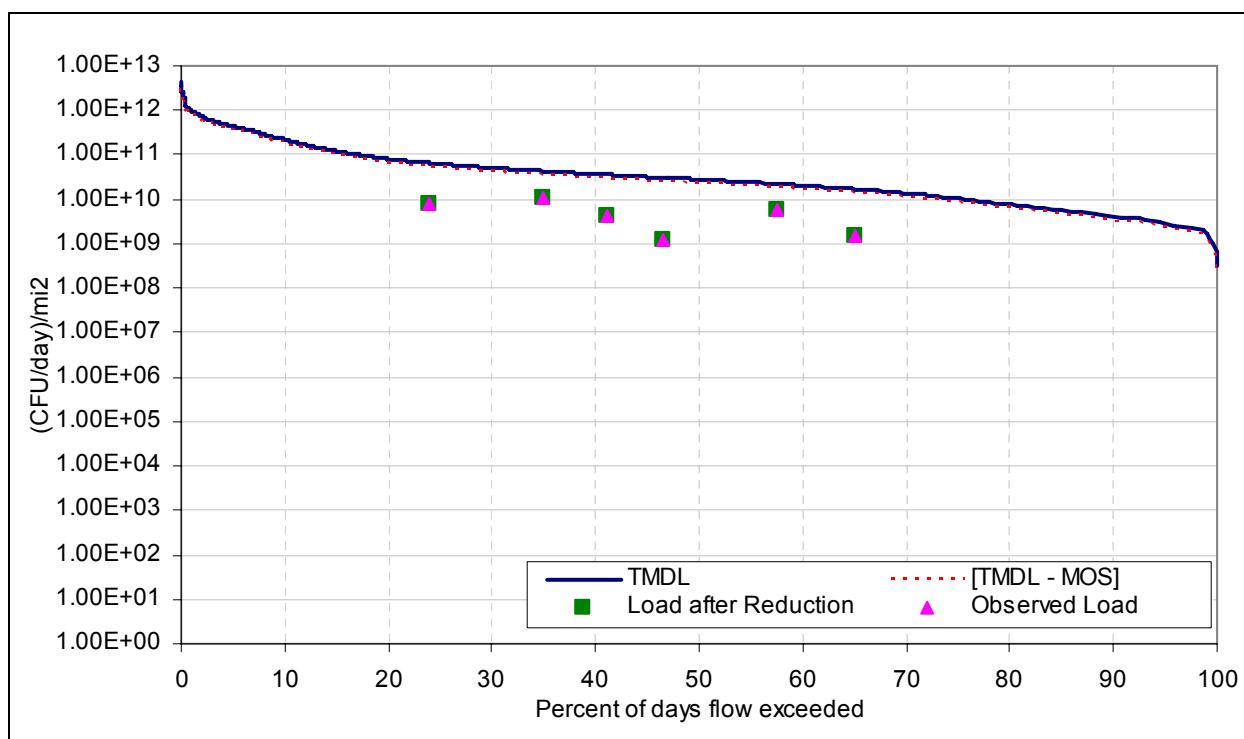


Figure N-10. Winter fecal coliform bacteria load duration curve for Kisatchie Bayou (subsegment 101103) south of Cypress, Louisiana (station 1218).

Table N-19. Winter allowable fecal coliform load for Kisatchie Bayou (subsegment 101103) south of Cypress, Louisiana (station 1218)

Season	Date	Observed flow (cfs)	Percent exceedance for observed flow	Adjusted flow for entire basin			Width for area under curves (%)	Allowable load to meet standard (CFU/day)/mi ²	Target load with MOS incorporated (CFU/day)/mi ²	Area under TMDL curve (CFU/day/mi ²)
				cfs	cfs/mi ²	cms/mi ²				
Winter	11/1/00	1	100.000	0.2286	0.007	0.000	0.00	330542361.9478	297488125.7530	8.84E+10
Winter	11/2/00	1	100.000	0.2286	0.007	0.000	0.05	330542361.9478	297488125.7530	0.00E+00
Winter	11/11/80	2	99.947	0.4572	0.014	0.000	0.00	661084723.8957	594976251.5061	1.76E+05
Winter	11/12/80	2	99.947	0.4572	0.014	0.000	0.00	661084723.8957	594976251.5061	0.00E+00
Winter	11/17/81	2	99.947	0.4572	0.014	0.000	0.00	661084723.8957	594976251.5061	0.00E+00
Winter	11/18/81	2	99.947	0.4572	0.014	0.000	0.00	661084723.8957	594976251.5061	0.00E+00
Winter	11/17/81	2	99.947	0.4572	0.014	0.000	0.00	661084723.8957	594976251.5061	0.00E+00
Winter	11/18/81	2	99.947	0.4572	0.014	0.000	0.00	661084723.8957	594976251.5061	0.00E+00
Winter	11/19/81	2	99.947	0.4572	0.014	0.000	0.00	661084723.8957	594976251.5061	0.00E+00
Winter	11/20/81	2	99.947	0.4572	0.014	0.000	0.00	661084723.8957	594976251.5061	0.00E+00
Winter	11/21/81	2	99.947	0.4572	0.014	0.000	0.00	661084723.8957	594976251.5061	0.00E+00
Winter	11/22/81	2	99.947	0.4572	0.014	0.000	0.00	661084723.8957	594976251.5061	0.00E+00
Winter	11/23/81	2	99.947	0.4572	0.014	0.000	0.00	661084723.8957	594976251.5061	0.00E+00
Winter	11/24/81	2	99.947	0.4572	0.014	0.000	0.00	661084723.8957	594976251.5061	0.00E+00
Winter	1/31/99	5390	0.320	1232.1059	36.419	1.031	0.03	178162330898.8000	1603460997808.9200	4.75E+08
Winter	3/14/99	5630	0.294	1266.3678	38.041	1.077	0.03	1860953497766.2800	1674858147989.6500	4.97E+08
Winter	1/8/98	5890	0.267	1346.4015	39.797	1.127	0.03	1946894511872.7200	1752205060685.4500	5.20E+08
Winter	1/21/90	5960	0.240	1362.4028	40.270	1.140	0.03	1970032477209.0700	1773029229488.1600	5.26E+08
Winter	1/30/01	6000	0.214	1371.5465	40.541	1.148	0.03	1983254.171686.9800	1784928754518.2800	5.29E+08
Winter	1/29/99	6380	0.187	1458.4111	43.108	1.221	0.03	2108860269227.1500	1897974242304.4400	5.63E+08
Winter	1/15/98	6580	0.160	1504.1293	44.459	1.259	0.03	2174968741616.7200	1957471867455.0500	5.80E+08
Winter	1/14/89	6860	0.133	1568.1348	46.351	1.313	0.03	226752062962.1100	2040768542665.9000	6.05E+08
Winter	12/27/82	7540	0.107	1723.5768	50.946	1.443	0.03	2492289409086.6400	2243060468177.9700	6.65E+08
Winter	1/12/81	7840	0.080	1792.1541	52.973	1.500	0.03	2591452117670.9900	2332306905903.8900	6.92E+08
Winter	1/7/98	8610	0.053	1968.1692	58.176	1.647	0.03	2845969736370.8100	2561372762733.7300	7.60E+08
Winter	12/28/82	10200	0.027	2331.6290	68.919	1.952	0.03	3371532091867.8600	3034378382681.0800	9.00E+08
Winter	1/30/99	13900	0.000	3177.4160	93.919	2.660	0.00	4594538831074.8300	4135084947967.3500	0.00E+00

For brevity most of the cells in this spreadsheet have been hidden.

Table N-20. Winter existing fecal coliform load and percent reduction for Kisatchie Bayou (subsegment 101103) south of Cypress, Louisiana (station 1218)

Season	Date	Obs FC (CFU/100mL)	Flow/unit area on sampling day (cms/mi ²)	Percent exceedance for flow on sampling day	Current fecal coliform load (CFU/day)/mi ²	Reduced fecal coliform load (CFU/day)/mi ²	Allowable load with MOS incorporated (CFU/day)/mi ²	Reduced load less than or equal to allow load?
Winter	12/12/94	9000	0.028890993	30.4	2.246E+11	2.246E+11	4.492E+10	No
Winter	11/17/80	3300	0.005931264	75.1	1.691E+10	1.691E+10	9.222E+09	No
Winter	11/15/93	2800	0.009375223	66.1	2.268E+10	2.268E+10	1.458E+10	No
Winter	02/13/84	2400	0.684965270	0.6	1.420E+12	1.420E+12	1.065E+12	No
Winter	04/09/84	2400	0.165692716	8.0	3.435E+11	3.435E+11	2.576E+11	No
Winter	03/10/92	2400	0.055868676	17.6	1.158E+11	1.158E+11	8.687E+10	No
Winter	04/14/80	2300	0.241077162	5.5	4.790E+11	4.790E+11	3.748E+11	No
Winter	11/13/90	1600	0.002869966	87.0	3.967E+09	3.967E+09	4.462E+09	Yes
Winter	04/15/91	1600	0.334829392	3.1	4.628E+11	4.628E+11	5.206E+11	Yes
Winter	02/08/94	1600	0.012436520	58.7	1.719E+10	1.719E+10	1.934E+10	Yes
Winter	11/18/96	1600	0.001530649	95.9	2.115E+09	2.115E+09	2.380E+09	Yes
Winter	04/14/97	1600	0.034822257	25.9	4.813E+10	4.813E+10	5.414E+10	Yes
Winter	03/08/82	1300	0.017985122	46.0	2.020E+10	2.020E+10	2.796E+10	Yes
Winter	02/11/85	1300	0.235337230	5.7	2.643E+11	2.643E+11	3.659E+11	Yes

For brevity most of the cells in this spreadsheet have been hidden.

Winter	01/09/84	33	0.023725054	36.5	6.763E+08	6.763E+08	3.689E+10	Yes
Winter	01/14/85	33	0.014158500	54.7	4.036E+08	4.036E+08	2.201E+10	Yes
Winter	03/11/85	33	0.020663757	41.1	5.890E+08	5.890E+08	3.213E+10	Yes
Winter	04/10/89	30	0.015497818	51.3	4.016E+08	4.016E+08	2.410E+10	Yes
Winter	01/06/97	26	0.005931264	75.1	1.332E+08	1.332E+08	9.222E+09	Yes
Winter	04/13/81	23	0.002104642	92.6	4.181E+07	4.181E+07	3.272E+09	Yes
Winter	11/16/81	23	0.000573993	99.7	1.140E+07	1.140E+07	8.925E+08	Yes
Winter	04/12/82	23	0.006313926	74.0	1.254E+08	1.254E+08	9.817E+09	Yes
Winter	11/16/82	23	0.001147986	98.7	2.281E+07	2.281E+07	1.785E+09	Yes
Winter	02/04/91	20	0.017219797	47.7	2.975E+08	2.975E+08	2.677E+10	Yes
Winter	01/11/82	17	0.001913311	93.1	2.810E+07	2.810E+07	2.975E+09	Yes
Winter	03/11/96	17	0.002487304	89.3	3.652E+07	3.652E+07	3.867E+09	Yes
Winter	01/12/81	8	0.002104642	92.6	1.454E+07	1.454E+07	3.272E+09	Yes

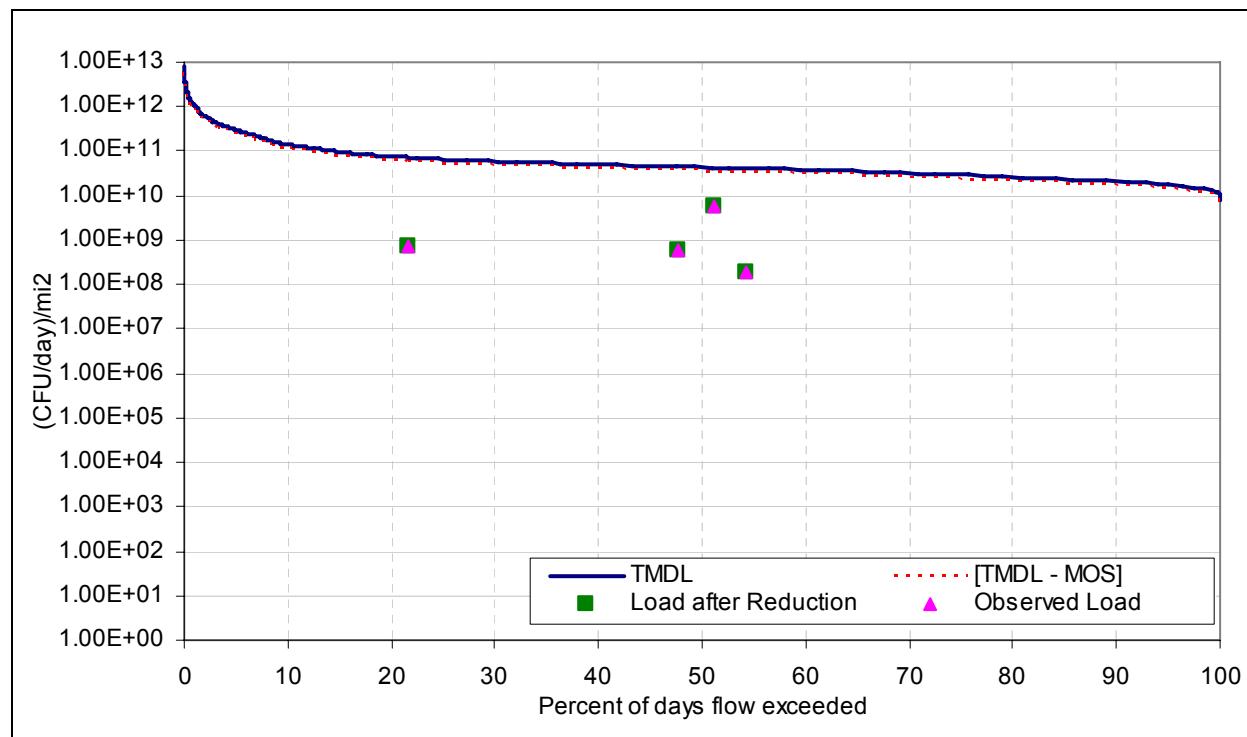


Figure N-11. Winter fecal coliform bacteria load duration curve for Nantachie Creek (subsegment 101301) east of Montgomery, Louisiana (station 1215).

Table N-21. Winter allowable fecal coliform load for Nantachie Creek (subsegment 101301) east of Montgomery, Louisiana (station 1215)

Season	Date	Observed flow (cfs)	Percent exceedance for observed flow	Adjusted flow for entire basin			Width for area under curves (%)	Allowable load to meet standard (CFU/day)/mi ²	Target load with MOS incorporated (CFU/day)/mi ²	Area under TMDL curve (CFU/day/mi ²)
				cfs	cfs/mi ²	cms/mi ²				
Winter	11/1/00	8	100.000	2.5083	0.157	0.004	0.00	7673767775.4163	6906390997.8747	9.11E+10
Winter	11/2/00	8	100.000	2.5083	0.157	0.004	0.05	7673767775.4163	6906390997.8747	0.00E+00
Winter	11/3/00	10	99.951	3.1354	0.196	0.006	0.02	9592209719.2704	8632988747.3433	3.74E+06
Winter	11/4/00	11	99.927	3.4489	0.216	0.006	0.00	10551430691.1974	9496287622.0777	2.33E+06
Winter	11/13/00	11	99.927	3.4489	0.216	0.006	0.00	10551430691.1974	9496287622.0777	0.00E+00
Winter	11/14/00	11	99.927	3.4489	0.216	0.006	0.00	10551430691.1974	9496287622.0777	0.00E+00
Winter	11/15/00	11	99.927	3.4489	0.216	0.006	0.10	10551430691.1974	9496287622.0777	1.03E+07
Winter	11/11/82	12	99.830	3.7624	0.235	0.007	0.00	11510651663.1244	10359586496.8120	0.00E+00
Winter	11/7/82	12	99.830	3.7624	0.235	0.007	0.00	11510651663.1244	10359586496.8120	0.00E+00
Winter	11/8/82	12	99.830	3.7624	0.235	0.007	0.00	11510651663.1244	10359586496.8120	0.00E+00
Winter	11/9/82	12	99.830	3.7624	0.235	0.007	0.00	11510651663.1244	10359586496.8120	0.00E+00
Winter	11/10/82	12	99.830	3.7624	0.235	0.007	0.00	11510651663.1244	10359586496.8120	0.00E+00
For brevity most of the cells in this spreadsheet have been hidden.										
Winter	2/13/97	2160	0.292	677.2375	42.353	1.199	0.02	2071917299362.4000	1864725569426.1600	5.04E+08
Winter	1/28/94	2170	0.268	680.3729	42.549	1.205	0.02	2081509509081.6700	1873358558173.5000	5.07E+08
Winter	12/12/98	2680	0.243	840.2762	52.549	1.488	0.02	2570712204764.4500	2313640984288.0100	6.26E+08
Winter	3/5/84	2740	0.219	859.0883	53.725	1.521	0.02	2628265463080.0800	2365438916772.0700	6.40E+08
Winter	3/2/01	3410	0.195	1069.1574	66.863	1.893	0.02	3270943514271.1900	2943849162844.0700	7.96E+08
Winter	1/12/91	3500	0.170	1097.3756	68.627	1.943	0.02	3357273401744.6200	3021546061570.1600	8.17E+08
Winter	4/23/95	3760	0.146	1178.8949	73.725	2.088	0.02	360667085445.6500	3246003769001.0900	8.78E+08
Winter	12/27/82	3840	0.122	1203.9778	75.294	2.132	0.00	3683408332199.8200	3315067678979.8300	0.00E+00
Winter	4/29/91	3840	0.122	1203.9778	75.294	2.132	0.05	3683408332199.8200	3315067678979.8300	1.79E+09
Winter	12/26/82	3890	0.073	1219.6546	76.275	2.160	0.02	373136380796.1700	3358232622716.5500	9.08E+08
Winter	2/12/84	4870	0.049	1526.9197	95.490	2.704	0.02	4671406133284.6600	4204265519956.2000	1.14E+09
Winter	3/7/95	5650	0.024	1771.4777	110.784	3.137	0.02	5419593491387.7500	4877633642248.9800	1.32E+09
Winter	11/16/87	8610	0.000	2699.5439	168.824	4.781	0.00	8258892568291.7800	7433003311462.6000	0.00E+00

Table N-22. Winter existing fecal coliform load and percent reduction for Nantachie Creek (subsegment 101301) east of Montgomery, Louisiana (station 1215)

Season	Date	Obs FC (CFU/100mL)	Flow/unit area on sampling day (cms/mi ²)	Percent exceedance for flow on sampling day	Current fecal coliform load (CFU/day)/mi ²	Reduced fecal coliform load (CFU/day)/mi ²	Allowable load with MOS incorporated (CFU/day)/mi ²	Reduced load less than or equal to allow load?
Winter	04/16/02	280	0.024985588	51.1	6.043E+09	6.043E+09	3.885E+10	Yes
Winter	01/22/02	26	0.026096059	47.6	5.861E+08	5.861E+08	4.058E+10	Yes
Winter	03/26/02	20	0.042197882	21.7	7.290E+08	7.290E+08	6.561E+10	Yes
Winter	02/18/02	9	0.023875118	54.3	1.856E+08	1.856E+08	3.712E+10	Yes